NOVEMBER, 1942

Industrial FINISHING

Published Monthly in the Interest of Modern Production Finishing

TECHNOLOGY DEPT.

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Also, BUY Lilly Finishes to paint bombs. There are Lilly Finishes for Bombs, Shells and Planes . . . and for all accessories and implements of war.

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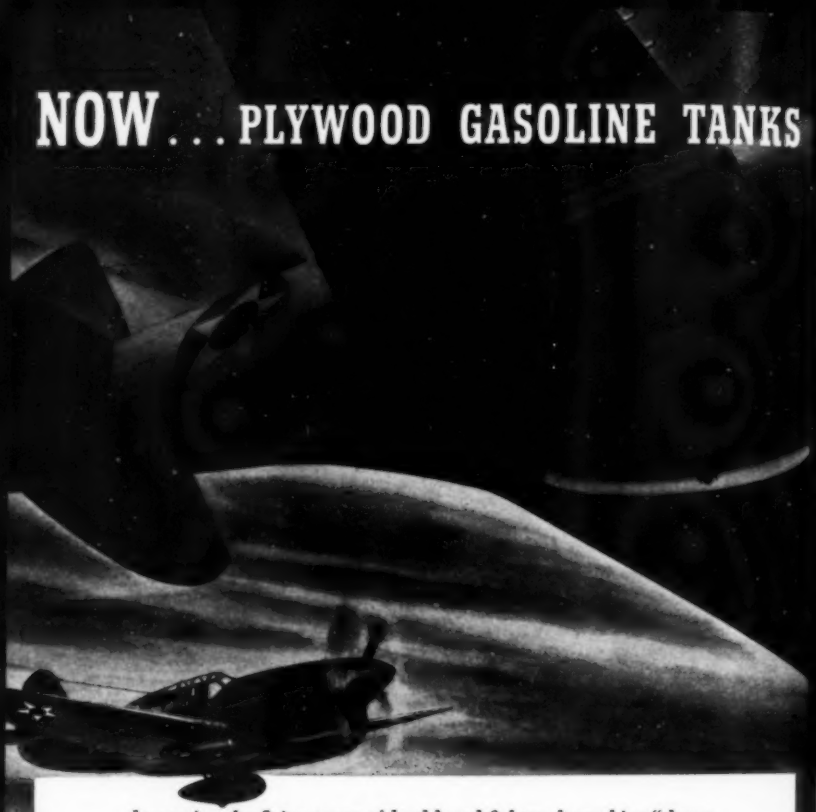
Indianapolis, Indiana
Branches: Chicago, Ill.; Grand Rapids, Mich.; Gardner, Mass.
THE LILLY COMPANY, High Point, North Carolina

NOW... PLYWOOD GASOLINE TANKS



Increasing the flying range of land based fighters by making "throw away" plywood gasoline tanks practical is just one of the jobs a new Roxalin gasoline-proof lacquer is doing. It is also being used on cork floats for fuel tank indicators, navigation equipment and recording instruments.

MAYBE YOU CAN USE THIS NEW GASOLINE-PROOF LACQUER

THE characteristics of this new material may suggest how you can utilize it to do a better job. It is impervious to a mixture of 100 octane gasoline and aromatic solvents . . . also to alcohol . . . has been tested on plywood, cork, fibre and metals . . . is water white . . . air dries or can be baked as high as 300°F. or above without discoloration . . . possesses high retention of flexibility . . . excellent water and moisture resistance, and may be sprayed, dipped or roller coated.

If your Production and Engineering Departments can use our experience with this new material in expediting war production, where the necessary priorities are applicable, you can count on our prompt cooperation.

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For War Production "Musts"... Speed - Precision

Easy RECIPROCATING ELECTRIC SANDER

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Sanding, Rubbing, Polishing . . . . EASY Reciprocating Electric Sanders are performing indispensable three-shift duty in the production and maintenance of wood, metal, plastic, composition . . airplanes, parts, gliders, propellers, guns, searchlights . . polishing alloy dies, and hundreds of other applications . . with savings of 50% to 75% in time, labor and abrasives.

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the attached postcard for information on how to

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SPEED WAR PRODUCTION
THE "EASY" WAY

Finishing plastic parts.

Removing pits, polishing, sanding, hi-lighting, etc., metal and wood propellers.

Cuts time 70% sanding plywood or metal airplanes and gliders.

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ZAPON FINISHES HELP SAVE METAL

—A VITAL WAR FUNCTION

IN these war days, when every American is being urged to conserve metals and to push the campaign for scrap metals to help keep our war plants going—it is vital that every means be used to employ other materials in place of critical metals. Zapon is helping by producing finishes that contribute to this vital war function.

Wood, plastics, fabrics, pulp, in a multitude of ways take the place of metals. Finished steel shell cases replace brass; plywood planes and gliders take the place of metal; pulp, impregnated and finished, serves in place of metal for containers; Masonite finishes extend use of this product—to name but a few. Proper finishes help to give these materials, working in new surroundings, the resistance, the appearance, the practical usefulness and long life that are necessary. In this work, Zapon plays an important part.

New Zapon formulations, the result of years of research and experience in finishing combined with today's newest materials, are helping to effect remarkable savings in critical materials. Equally important are the finishing procedures to speed today's wartime industrial production. Our facilities are ready to serve in our mutual wartime problems.

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Eastern Sales: Stamford, Conn. Western Sales: North Chicago, Ill.

INDUSTRIAL FINISHES

R v.19 Nov. 1942 - Oct. 1943

NINETEENTH YEAR OF PUBLICATION

Industrial FINISHING

Reg. U. S. Pat. Office

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Contents of This Issue

Letters from Readers of Industrial Finishing 4
Streamlined Production on the Finishing Line 10
Spraying Inside Shells, Tubes and Containers 16
Railroad Car Painting and Letter Stenciling 21
Surface Treating New Plywood for Durability 23
Largest Spray Painting Enclosures for Bombers 28
Finishing Wood Pulls, Knobs for Furniture 37
Yes, French Polishing on a Modern Production Basis 48
New Materials, Supplies, Equipment 60
Questions; Answers 66
New Books, Catalogs, Circulars, News Releases 84
Editorial 92
"Classified Advertising" Section 103
Advertisers' Index 104

Air Engineering Bulletin 20
Kidde Fire Extinguishers 22
Magnus Chemical Organizes Machine Division 32
Facts for Finishers 38
Plastic Finishes 44
Heats Cleaning Solution Better 44
Explosion-Proof Timers 64
Rudd Lacquer Corp. Appoints New England Representative 64
New Synthetic Replaces Rubber in Raincoats 74
Enameled Wire 76
Tuf-On Finish Bulletin 76
Safety Suit for Women in War Industry 76
Imitation of Rosewood on Willow 78
Oak Casket Finishes 78
Flame-Priming Steel for Paint 80
Use a Tack Rag 88
A Different Filter 88
Removable Stickers 97
Hand Cream 98
Removes Burrs Quickly 98
Portable Dust Collector 99
Chicago Firms Organize Pool for War Business 103

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Tech

Letters from Readers...

OF INDUSTRIAL FINISHING

These letters (and many others) were answered recently by the editorial department, but are published here to reveal certain interesting trends of desire and activity in the industry, and to encourage additional inquiries, comments and suggestions. Further information about any of them can be obtained by writing this office.—Editor.

Masonite Plywood Finishing

Have any past issues of INDUSTRIAL FINISHING carried articles concerning the forming and finishing of Masonite plywood? If so, are such issues or reprints available? We are interested in information on this subject.—N. P. Co.

Plastic Paints

We are interested in obtaining information regarding plastic paints.—C. S. Co. (Venetian Blinds).

Fire Resisting O. D. Paint

Can you inform us where we can secure information about a fire-resisting olive drab paint for use on wood? —W. Co.

In a letter we suggested the names of a few manufacturers. However, we will appreciate getting more information on this from advertisers and readers.—ED.

For Coating Nails

Carpenters in this vicinity (Vancouver, B. C., Canada) have lately been complaining that galvanized nails have made them sick, particularly when nails are held in the mouth by shinglers. We understand that some manufacturers in the United States are using a plastic coating after the galvanized treatment to prevent oxidization of the zinc which might come off in the mouth of the shinglers. We would appreciate your advising us at your earliest convenience if you are able to supply or recommend a plastic coating to solve our problem—D. Rustproofing Co., Ltd.

Mexican Chair Manufacturer

In the August 1942 issue of INDUSTRIAL FINISHING there appears, on page 62, under the heading of "Chair Finishes", an inquiry from Cia. Mfra. De Muebles "La Malinche". We are in the restaurant and hotel supply business and should like very much to contact this Mexican manufacturer and would appreciate it very much if you would be so kind as to send us the address.—Mangrum Holbrook & Elkus.

The company is located in Monterrey, N. L., Mexico.—ED.

Composition Carving Data

On page 8 of July 1942 INDUSTRIAL FINISHING, the C. Cabinet Co. asks for composition carving data. Also, on page 8 of June issue there is reference to wood flour compositions.

I may be able to help these peo-

DOLAN WAR FINISHES

for WOOD and METAL

Olive Drabs ★ Rot Inhibiting Primers
Lustreless Enamels ★ Battleship Grays
Shell Lacquers ★ Airplane Dopes

If you are figuring on Government contracts with the Army, Navy, Air Corps or any branch of service—we are equipped to furnish the finishes according to Government specifications. Our staff of Laboratory Technicians is familiar with all problems and its services are available for the asking.

Also Still Available

DU-BAR BLEACH For modern light-tones ★ FABRI-CLEAN The magic Fabric Cleaner

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Mfrs. of "Unquestionable Quality" Industrial Finishes

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FASTER PRODUCTION FOR WAR INDUSTRIES

with Sterling Portable Speedbloc Sander

STERLING TOOL PRODUCTS CO.
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SPECIFICATION PROTECTIVE COATINGS

UNITED'S Specification Protective Coatings are doing their part to help keep war production schedules rolling.

There is a specially formulated United product to meet the rigid requirements of any Government specification protective coating. Years of constant research and product development have enabled us to meet the unusual requirements and demands of war work.

Call on United for Government Specification Coatings and let us help you solve your finishing production problems and "Keep 'Em Rolling."

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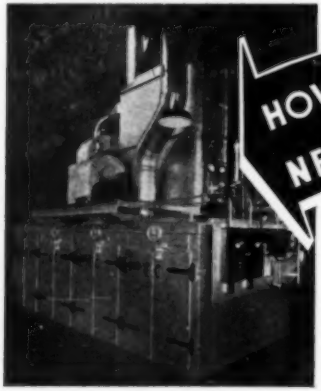

HOW SOON DO YOU NEED AN OVEN?

GKS CAN DELIVER

standardized ovens or specially designed systems for handling any kind of drying or baking job.

GKS dependable ovens and finishing systems are helping to speed up production in war plants all over America. They'll do the same for you.

PHONE, WIRE OR WRITE US ABOUT YOUR REQUIREMENTS . . . . TODAY!

GEORGE KOCH SONS, INC. Evansville, Ind.

ple and would like to get in touch with them and ask that you furnish their addresses, and also that of W. & Sons, page 76, July number who make wood flour products.

Would like to know who makes "Lintite" referred to on page 26 of August issue.—W. O. Davis.

Information supplied. "Lintite" paint is manufactured and sold by Linings, Inc., 914 S. Wabash, Chicago, Ill.—Ed.

Pyroxylin-Coated Fiber-board

At the present time we are interested in locating a source of supply for approximately .050 fiber-board with pyroxylin coating. One of our friends has suggested that possibly you could advise us of a source of supply for a material of this kind. If so, we would appreciate any information that you might be able to give us.—A. G. Co.

Will some reader please help us on this?—Ed.

Stain Bleach

In your January, 1942, issue, page 42, code number 131, I notice something about a stain bleach which is also good for removing stains from operators' hands. Could you tell me who the manufacturer is?—E. F.

The stain you inquire about is a product of M. L. Campbell Co., 706 E. 19th St., Kansas City, Mo.—Ed.

Waterproofer for Plywood

In your September issue of Industrial Finishing (page 4) there appeared a letter from the Liquafill Mfg. Co. We are interested in contacting them for further information regarding their product and also for a sample of Liquafill Size. Anything that you can do to help us get in touch with this company will be greatly appreciated.—E. W. Co. (Aircraft Plywood Subassemblies).

Another inquiry of the same kind is answered on page 4 of October issue.—Ed.

Penetrating Black Stain

There is a penetrating black stain for laboratory table tops that involves the application of two chemicals, one of which is aniline or aniline hydro-

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FINISHES

Manufacturers

of

Clear and Pigmented Dopes

Dope Thinners

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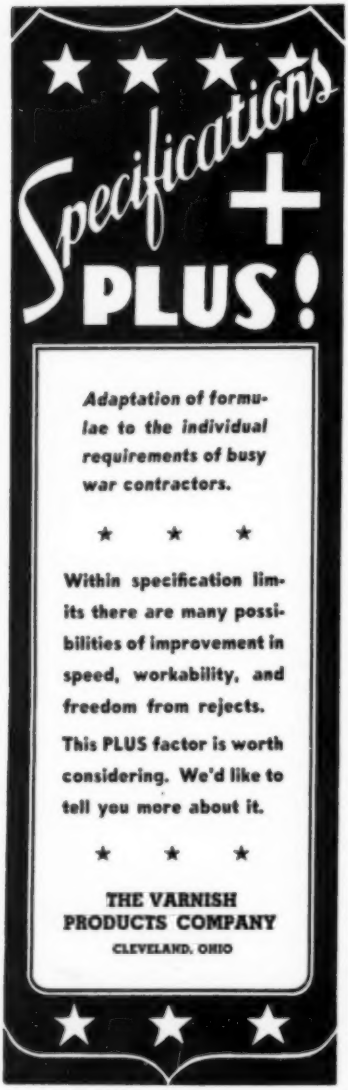
LACQUERS SYNTHETICS VARNISHES


Specifications
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PLUS!
Adaptation of formulae to the individual requirements of busy war contractors.
★ ★ ★
Within specification limits there are many possibilities of improvement in speed, workability, and freedom from rejects.
This PLUS factor is worth considering. We'd like to tell you more about it.
★ ★ ★
THE VARNISH PRODUCTS COMPANY
CLEVELAND, OHIO

chloride. At one time I had the details regarding this process, but am unable to locate them. Would appreciate it if you will give me the process in detail.—R. W. A. (Technical Director for Finish Mfr.)

Do They Need Stencils?

We notice in September, 1942, issue of INDUSTRIAL FINISHING, an inquiry on page 8, under the heading "Automatic Spray Machine", concerning a reader who has 150,000 wooden boxes to paint for the government.

It is possible that these boxes will also require certain information stenciled on them. Inasmuch as we are manufacturers of spray painting masks and stencils we would appreciate the name of this company so that we might contact them.—Conforming Matrix Corp.

Information Wanted About Compo. Ornaments

As a reader of INDUSTRIAL FINISHING Magazine since 1926, I have found this of immense value in information, just in time of need, and I await it eagerly each month to share the news and troubles of others. It is a pleasure to find cooperation between some of the foremen through their willingness to help others out of trouble.

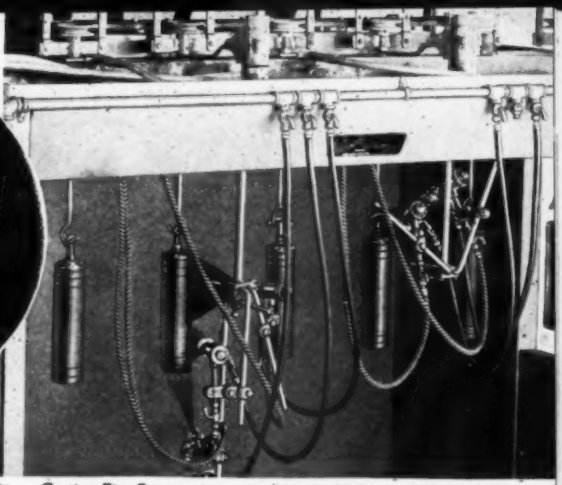
Like many others all over the country I now have more problems than ever, due to prevailing conditions of war time. I have to resort to different channels to find what I need and then perhaps new troubles start all over again. But I don't mind that, as it is always educating to learn about something different. In other words, I love it. If we didn't have troubles we'd never gain results and experience.

I have had plenty of experience in furnishing ornamentations for furniture . . . . and in metal finishing. As you probably realize, metal is an important item in manufacturing most anything today, but since we are rationed to a certain amount, we have to substitute some plastic material for certain small jobs of less importance.

I remember quite a number of years ago, when I was in the furniture industry, that we used a plastic ornamentation which could be bought in any size and it is still used today by some firms for making all sorts of things, such as bookends, clock cases, etc. I do know of a firm in Syracuse, N. Y., that makes a variety of items

(Continued on page 99)

GOING to a FIRE *in a hurry!*



Coating Fire Extinguishers on a Paasche Automatic Airpainting Unit

DOWN the line they come. They spin in the path of the first battery of Automatic Airbrushes and get their initial application of war paint. Another application from the second battery, then on they move—hurrying to stop some fire—save lives—property—help win a war. These fire extinguishers, getting their protective coating on a Paasche Automatic Airpainting Unit, pictured above, are one of hundreds of products for war—from ships to shells—that require painting. This unit is one of thousands of Paasche automatic or manual airpainting units that are speeding these jobs . . . producing quality finishes at lowest cost.

The manufacturer of fire extinguishers was faced with increased production—a new finishing problem. The answer to his situation was a Paasche Automatic Airpainting Unit.

Make a checkup of your finishing department today—perhaps you can increase your output many times. Remember there's a Paasche Airpainting Unit that does your work better, faster and at a minimum cost.

The Paasche CUB High Production Airbrush is the all-round gun for every plant

Get this gun—it is the one you need for every manual wartime finishing job. Its light weight and strength save time and cut costs. Its multiple features and highly efficient operation increase your production right from the start. Get the facts in Bulletin FM8-42.

Paasche Airbrush Co.

1917 DIVERSEY PARKWAY
CHICAGO ILLINOIS

Left: A worker attaching small parts to the dipping line conveyor. The parts are carried by overhead conveyor through the dip tanks where they receive a coating of zinc chromate primer. The same conveyor carries them between two batteries of infra-red lights for quick drying.

Right: As aircraft parts come from the chromodizing tanks, they are placed on a flat-bed conveyor which carries them under an automatic spray where they receive a coat of zinc-chromate primer. This paint is dried within a few seconds by infra-red lights. This method saves from 400 to 600% in time over previous methods.

Streamlined Production

IN DAYS when beauty was only skin deep, and paint shop operators were able to devote as many hours as they wished to "primping" their lady of the sky for her debut, equipment, materials and methods could remain obsolete and it didn't make any particular difference. But when the old gal's eyes began to flash with gunfire and her caress became a kiss of death—when to her very soul she was girded and processed and made stout and strong in her zeal to defend her homeland—the word "streamlined" took on a new meaning.

In the aircraft industry today that word, "streamlined", does more than reflect the design and flight characteristics of the airplane. Due to the enormous all-out program necessary to overcome the lead gained against us by our enemies who were prepared and ready for the hour that was to come at their own bidding, U. S. manufacturers must look forward to the necessity of streamlining every phase of production, from the drawing board to the flight line.

Streamlined Production

In attempting to solve the many problems of how to turn out more airplanes per month in 1942 than were built in a full year before the fall of France, aircraft manufacturers have had to speed up their finishing departments, even before they could consider faster-moving assembly lines. Final and sub-assembly are merely a process

On the Finishing Line

BY MAXWELL STILES
Lockheed Aircraft Corporation

of putting together parts that have come from fabrication and finishing, and if there exists a bottle-neck in either of these departments, the whole production line flattens out and weeps to the tune of "The Merry-Go-Round Broke Down."

Streamlining of the finishing department to meet the currently increasing production effort has created a demand for all types of high-speed mechanized equipment, such as motor-agitated automatic dip tanks, belt-type conveyors with automatic reciprocating spray guns, overhead monorail conveyors through color booths, infra-red drying lamps on all lines, downdraft cooling fans and numerous other types of specialized equipment.

Abundant Supplies of Various Materials

To keep up with the increased tempo of the parade, supplies used in the finishing of aircraft have become more abundant and varied. We are now able to purchase all types of masking tape, decals, tack rags, etc., and there is also available to the finisher a larger line of thinners, solvents and finishing materials, such as lacquers, synthetic lacquer and enamels supplied for each and every purpose. Of considerable import-

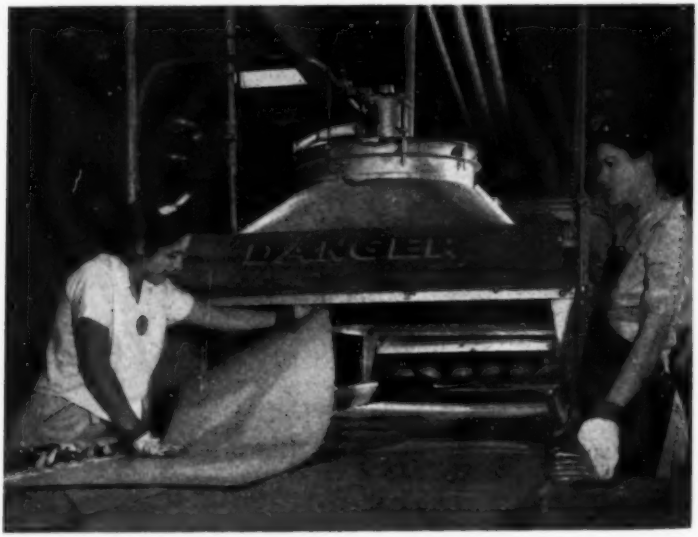
ance in this hurry-up program are new-type faster-drying synthetic high-solids lacquers and improved baking enamels that react quickly to the drying lamps.

How Many of Our Problems Were Solved

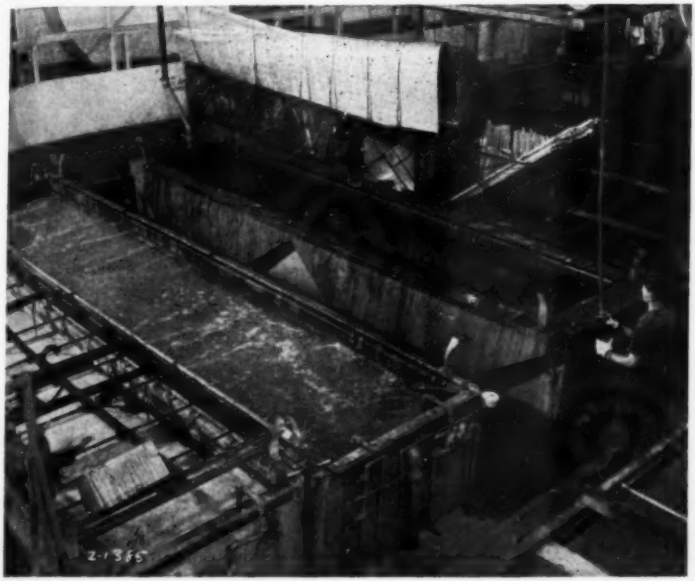
Some conception of the tremendous problems of finishing airplanes on a war-time scale may be judged from the fact that there are only about 1000 parts processed per automobile, but in a Lockheed Hudson bomber there are 10,500. The problem has been solved at Lockheed largely through the untiring efforts of men in the finishing department, working in conjunction and harmony with our production and plant engineers. These men have been very helpful in coordinating with manufacturers of equipment, in the converting to aircraft finishing of much specialized equipment hitherto devoted entirely along other lines.

As the result of this coordination of minds, the finishing department at Lockheed is laid out so that all work flows in a straight line. Parts enter through inspection departments, are checked and turned over to Dispatching, where a physical count is made. Orders are tagged as to quantity and type of finish.

The parts for chromodizing are then loaded into large metal containers, picked up by crane, and



Small parts are sprayed with zinc chromate primer and then dried under infra-red ights. The parts are carried along on a moving flat-bed conveyor, and are under the lights for about 20 seconds, during which time they dry. Then they pass under cooling fans and are turned over by operators to receive a similar coat of paint on the other side.



General view of anodizing and chromodizing tanks in Lockheed's finishing department.

sent through the cleaning and chromodizing sequence as follows:

1) Soap tank; time, approximately 12 minutes.

2) Rinse; time, three minutes.

3) Chromodizing in 5% chromic acid; time, five to eight minutes.

4) Rinse; time, three minutes.

5) Electric hot air dryer; time, 12 minutes.

All cleaning and surface treatment tanks are 21-ft. long, 4-ft. wide and 7-ft. deep.

Masking; Dipping; Spraying

Areas that are to be protected from paint are masked off with tape. Parts are now ready to receive various finishes, and the metal tags are checked for finish and the parts routed through the specified section. All parts receive a coat of zinc chromate primer.

Parts that are adapted to dipping move down the conveyorized dip line, while other parts are loaded onto the belt conveyor and either coated by automatic spray gun or manually by spray operators. All parts that require subsequent finishing (such as color, etc.) are routed through the color booths or stacked on trays and sprayed on rotating tables.

Infra-Red Drying; Merits of Zinc Chromate

All conveyor lines are equipped with infra-red lamps to expedite the drying. Conveyor speeds are

Workers placing aircraft parts in the rack preparatory to immersion in chromodizing tanks. This process serves the dual purpose of a corrosion preventative and making the zinc chromate primer adhere to the surface of these parts.

variable to accommodate different types of orders, and drying time under the lamps varies between 20 and 30 seconds.

In this process zinc chromate has been a Godsend to the industry. Not only does it dry quickly, even without the use of lamps, but it is non-cracking, does not check upon exposure, is non-bleeding and meets the standard flexibility requirement of the United States Government—a 360° bend around a ¼-in. mandrel. Because the inhibitive type primer liberates a certain amount of chromate ions which, on contact with water, renders the moisture non-corrosive, it is used practically as a base for all finishes and also as a protective medium or coating. It is thoroughly resistant to all types of weather.

In the dip tank operation there is very little waste (practically the only loss is evaporation of solvent from the dip tank) but it would be definitely handy, in the opinion of Jack Eaton, Lockheed swing-shift superintendent who moved up after many years as paint-shop foreman, to have some spray equipment that could be used with no over-spray, which at present cannot be controlled.

Spray and Over-Spray; Reclaimed Material

"In spray operations, through time and motion studies, we have found ways of grouping our work to get more miles per gallon than we have in the past," Eaton declares, "and yet 40% of the material is lost in the spray operation and no way has been found to relieve the loss. At the present time we are going through a reclamation period of our old primer and materials which are separated to a water-wash and spray bath. The residue is picked up and the water is dehydrated and put back into solution. So far this is only in the testing stage. We are not using the reclaimed material, but we have a tremendous amount of it which we hope to be able to use some day.

"We find that it is hard to get rid of excess moisture. The water solution in the spray bath catches your over-spray which contains a certain amount of alkali, which has to be removed so as to not affect the aluminum."

Eaton stressed the fact that while the company's research department is continuously conducting experiments in the use of finishing materials, Lockheed adheres rigidly to the manufacturer's instructions in all production finishing. "We have access to the laboratories and to the consultation of the staffs that are retained by

the manufacturers in our local area," he said. "They have technicians to service the factory and instruct our workers in use of their product. In our own department we have a certain type of laboratory equipment for testing the viscosity of the paint. All is checked every four hours, whether adding more thinner or more paint, and everything is mixed or applied according to the directions of the manufacturer or the Army."

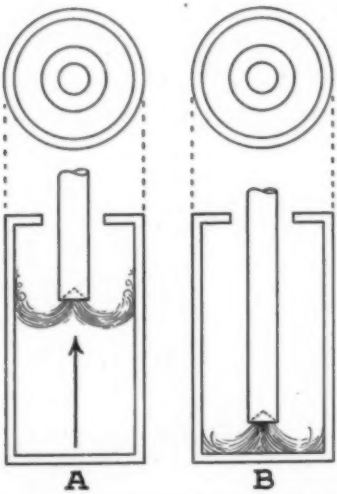
Eaton estimated that the dip tanks and flat-bed moving spray booth, working in conjunction with the infra-red lights, save from 400% to 600% in time. And from start to finished airplane in camouflage, the total man hours devoted to the exterior of the plane have been cut down from about 175 man hours to 25 man hours. This represents not only a huge saving in the cost of building the airplane, but it gets out a great many more finished war birds in the same amount of time.

And in these days, time is everything. Either we get our airplanes "finished" in speedy tempo, and in mass production, or the enemy's planes will finish us.

After aircraft parts have been dipped in zinc chromate primer they are dried in a few seconds by being carried by overhead conveyor between two batteries of infra-red lights. A worker then stamps proper parts numbers onto the parts as they move past by conveyor.

Spraying Inside Shells,

The interiors of a variety of war products must be coated completely, uniformly, quickly. This can be accomplished with spray guns that are designed especially for this work, but they must be set up, operated and maintained with real skill.



A—If a gun is opened to spray before it reaches close to the bottom of container, the air pressure quickly builds up to a point where no paint will reach the bottom or inside near bottom; it will spread around inside near opening.

B—For complete coverage, insert gun clear into opening with nozzle close to bottom before pulling trigger to release flow of material and air. Immediately begin withdrawing gun, as air pressure within builds up and starts forcing air and material back along the insides of container and out through its opening.

DEMANDS created by the war have made many changes in the design, application and use of all types of spray equipment. For years spray guns specially designed for particular uses have been sold, but little has been said about them. Some of these special spray guns are normally called "extensions", as they are usually made to reach some almost inaccessible or hard-to-get-to place which otherwise would not be coated—leaving a place to rust or cause some other trouble.

In certain manufactured items many of these inaccessible places have not even been within the range of vision, therefore they have been more or less neglected. But when the Army contracted for war equipment those in authority insisted upon all surfaces being coated. They wanted only the finest that could be produced. All surfaces had to be protected throughout with plating or paint.

To name only a few of the many places these special spray guns are needed to reach inside surfaces: The insides of shells, burster tubes, oxygen tanks, gasoline tanks, cartridge cases, tracer cavities, bombs, incendiary bombs, aviation engines, truck engines, transmission housings, differential housings, tubes, pipes, battery cases, small compartments, radio parts, aviation wing sections, dies, conduits, manifolds and oil passages.

Each special spray gun is made for a specific job. It is custom built and it may be designed on the principle of external or inter-

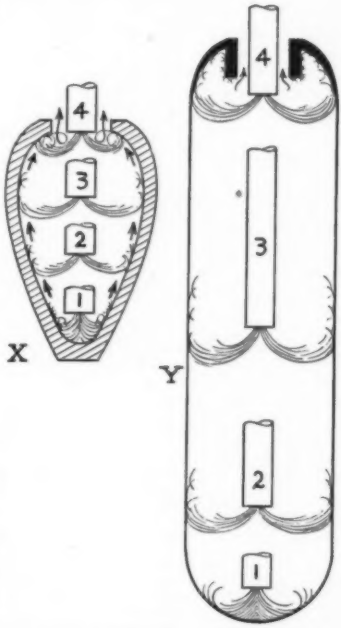
Tubes and Containers

BY GEORGE MONTGOMERY

nal atomization, or a combination of both, to get the desired result. The length and diameter of the extension will depend upon the size, shape and opening in the article to be interior-coated. In manufacturers' catalogues you can find listed spray guns made to spray at various angles, but these are for the more simple accessible places.

Technique of Internal Spraying

Extension spray guns are often used to coat interiors of shells, deep cavities or the interiors of containers, which necessitates a technique not employed with any other spray equipment. The head of the gun is inserted to the full depth of the cavity before spraying begins. At this point the spray is turned on and at the same time the extension begins to move outward, care being taken to keep the head of the gun moving along the lengthwise center line of the cavity. Otherwise one side of the interior will be coated heavier than the other, causing runs on one side and a skimpy coating on the other side. The speed of withdrawal will be governed chiefly by the shape and size of the interior being coated. A slower movement is needed where the surfaces are farther away, and a faster movement is required where they are close to



For an internal spraying job similar to X, the spray engineer might specify what is commonly known as a 45° forward cone, while for Y he would probably advise the use of a 60° forward cone. A few of the spray positions from start to completion are marked 1, 2, 3 and 4.

At position 1, the extension nozzle sprays the bottom of interior and creates pressure in this area. Withdrawal must begin immediately. Taking a look at say position 2, we see that pressure inside is spreading the 45° spray outward to a greater angle, so that sprayed paint is striking the sides of the interior, hitting them almost if not completely at right angles.

At position 3, this same thing continues, the mist being carried along the sides and toward the open end. As the nozzle is withdrawn the air pressure within causes paint to spread evenly over the areas surrounding the opening.

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the gun nozzle—in other words, small in diameter. This can be determined only by making actual tests.

Normally, a spray-gun air valve opens momentarily before the fluid valve is opened. Equipment used to spray a cavity must operate almost simultaneously because the atomizing air being blown into the cavity quickly begins to build up a higher pressure ahead of the gun tip in the extreme bottom, and in this way it could prevent the atomized paint from touching and coating the bottom.

As the spray gun nozzle is withdrawn through the cavity, spraying as it goes, the spray pattern is curved outward toward the interior walls and along the sides toward the exit, swirling around any slight obstructions.

Air Pressure Versus Fluid Pressure

The material adjustment is usually very high and equal to the atomizing air. If the fluid pressure is too high, with the air pressure too low, you have a condition that will cause paint to travel back through the air lines and air valves. Should you have the air pressure too high with too low material pressure, air will force paint back to the paint tank.

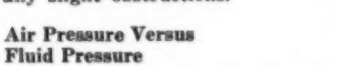


Diagram showing internal spraying. Several factors must be just right to make this method work effectively and economically.

To properly set up this type of equipment, set both the air and fluid pressures the same, say 30, 40 or 50 lbs. With higher pressures more paint will be sprayed for heavier coats. If after setting this pressure you find you have insufficient atomization, cut down the paint flow by closing the fluid adjustment on the spray gun. This will give higher atomization. The farther the surface to be painted is from the spray head, the higher the air and fluid pressure must be, and vice versa.

Example of spraying a hard-to-reach internal corner with special extension

If the object being coated can be rotated, such an arrangement is the most desirable, as defects in the spray pattern will be overcome and as a result you will have fewer rejects. On items that can not be rotated a study must be made to determine the most economical method of coating. This can best be done by actual tests.

From what has just been stated you will realize that considerable information must be at hand to determine the length, diameter, amount of spray, direction of spray, difficult angles to be reached, and the kind and type of paint

and its viscosity—and also some idea must be formed as to what the operator's motion should be and the speed of these motions.

Special Spray Guns Solve Many Problems

Special spray guns can be made to produce a round spray from straight forward to just about any degree backward toward the operator, or any part of the round spray from forward to back, see illustrations.

A special spray gun can be made to throw a fan spray from forward to about any degree backward. The fan spray may be at any angle to the center line of the extension. A special spray gun can be made with a round bushy spray from forward to about any angle to the side and rear.

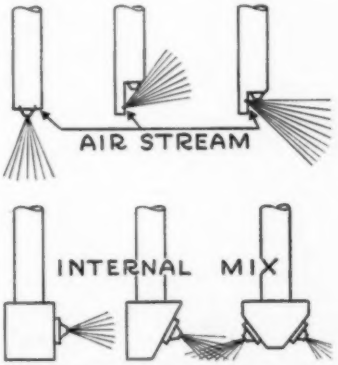
Special spray guns are available for spraying in two directions at the same time—but I would not recommend this, as special guns that spray in only one direction are troublesome enough. These guns do give trouble but most of it is avoidable if they are given the proper care. For instance, because of their length and lack of balance, operators will bend them, which makes them useless — or they may be bent just enough to cause faulty spraying.

How to Solve Special Spray Gun Troubles

When trouble is encountered with this type of equipment it is best to completely dismantle it and thoroughly clean each part with a suitable solvent. After cleaning each part, check the straightness of the needle, inner material tube and the outer air tube. A good method of testing the alignment is to place the tube over two parallel straight-edges — for instance, two smooth angle-irons. These straight-edges should be slightly lower at one end instead of level, so the tube will roll toward the low ends. If the tube is bent it will wobble as it rolls over the straight-edges. Locate the bend and straighten it. Continue this process until the extension is perfectly straight.

Examine each part for signs of possible breakage or excessive wear as you re-assemble the equipment. Each part should be tightened to make sure that air can not enter the fluid tube and vice versa.

On extension spray guns that employ the internal-mix principle, the fluid and air pressures must be nearly balanced; that is, both should be about the same. The air and fluid are mixed within the extension and broken up by various means, such as by swirling the air and fluid around a short screw. Then the mixture is given correct direction of spray through an

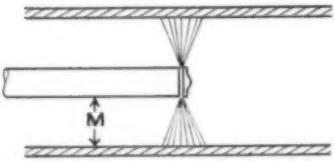


Both external and internal mix nozzles are available. Direction of spray can be arranged to meet conditions.

opening near the end of the extenson, which forms the spray pattern at the angle required.

The spray pattern opening may be from .001 to .020, depending upon the materials to be sprayed and the degree of atomization required for the surface to be coated.

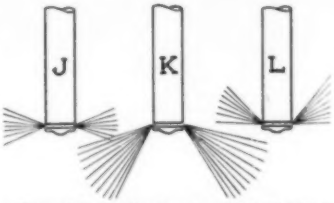
The material being sprayed should be free of all foreign matter and it should be sprayed at the same viscosity and temperature at all times. Likewise, the articles being coated should be at the same temperature while being sprayed.



Spraying insides of cylinder or pipe which is open at both ends. Distance M should not exceed 6-in. for good results.

Because of the fact that the extension gun must spray in a confined area where the fumes generally exhaust out of the same hole through which the extension must be inserted, the extension will naturally be coated with the sprayed material. This will cause little trouble if the operator will wash off the overspray at regular intervals with a good solvent. Care must be taken to see that no hard paint gets into the small opening of the spray head.

Because of the possible troubles just enumerated I would advise that for any special spray gun in use, a complete spare outfit should also be on hand ready for immediate use. *You are bound to have trouble at some time, and if you are not prepared for it when it starts your department will have to shut down or you will have to devise other means of doing your work, as these guns are custom built and take time to make or repair.*



Extension nozzles can be obtained which will direct spray outward (radiating from center outward all around circle). Spray can be directed straight out as at J, or at a forward angle as at K, or at a backward angle as at L.

For those who have special spray guns in operation and who are having trouble, remember to check the paint first; then check the extension alignment before you condemn the equipment. Most troubles are caused by the human element. Once put to work, I have found these guns indispensable.

There are many uses for special spray guns. From my experience I have found it best to call in the experienced, well-informed spray-equipment representatives when contemplating the employment of this equipment. They can be of valuable service to you.

Air Engineering Bulletin

A new illustrated bulletin entitled, "AAF in Industry", contains 32 pages 8½x11-in. bound between heavy paper covers. This bulletin has a great deal of practical information about the collection of dust and the filtering of air in industrial establishments. A few of the more general industrial dust problems and their solution are presented in the style of illustrated articles. Copies are free. Write American Air Filter Co., Inc., Louisville, Ky.

I received my INDUSTRIAL FINISHING *Magazine for July and was pleased to see the way my story was arranged. I have had several nice comments on it from our officials; also from friends in the supply business.*

My 35 years in the business as a student have been kind to me. I have enjoyed the trade and have worked at most of its branches. Have also studied art. I appreciate your asking me to write these practical articles. I am enclosing a write-up on metal stencils for freight and locomotive equipment.—THE AUTHOR.

Railroad Car Painting and Letter Stenciling

BY T. M. DAVIS

THE NEWLY painted well-groomed passenger coach is one of the finest and most lasting advertisements for a railroad. No equal expenditure for publicity makes the same favorable impression on the public. The painting and finishing of this equipment is a major factor in its maintenance.

This work should be done in a shop that is clean, light, well ventilated and heated in cold weather. Applying varnishes, lacquers or synthetic enamels in a cold shop, and especially to steel, will cause untold trouble. Materials will not flow out smoothly; they will sag, bloom, orange-peel—and the result is a poor job.

Most painting is now done with spray guns. These guns should be fast and efficient to handle heavy materials. In railroad work it is usually best for the spray operator to take care of the spray guns he uses. Where many guns are used by one man, this man becomes an expert and can keep his spray guns in repair and always ready for work.

Making and Cleaning Metal Stencils

The spray gun is also used to paint letters and numbers on freight cars and locomotives. The work is done with stencils made of zinc or brass, zinc being the most popular. A master pattern is made on stencil paper. This is traced on the metal which has been previously coated on both sides with an acid-resistant paint. The tracing is done with a needle-point metal pencil which scratches through the acid-proof paint, thereby exposing the metal. Mu-

ratic acid diluted with water (approximately 10%) is placed in a vat and the marked metal stencil is submerged. An experienced man can tell by touching the letters when the acid has eaten through. The stencil is then taken out of the vat and the acid-proof paint is removed with kerosene. Brass stencils are made practically the same way but nitric acid is used for cutting.

The insides of letters like A, B, D, O, P, Q and R are held in place with wire ties which are raised slightly to allow the spray to reach under them and thereby produce solid clean-cut lettering.

After they have been used these stencils are cleaned with solvent which is applied with a worn brush. This is better than wiping them with a cloth, as the cloth is likely to catch on sharp points or corners and may cause these to be bent out of shape or broken.

With proper care these stencils will wear indefinitely. Signs of all kinds are called for from the coach paint shop. These are made and shipped to all points on the division.

The silk-screen process is used for signs in quantities; likewise tranfer (decalcomania) signs. Glass is cut, oriented, sandblasted, chipped and etched. Mirrors are silvered.

Variety of Problems in Our Painting Department

Many problems come up for the paint department to solve. A spot on a carpet, plush or curtain can be removed if one knows the nature of the ingredient that has caused the spot and the chemical reaction of materials to remove same. Sometimes a little stain applied by a competent man will do wonders in matching up a spot. How many times have we seen a man spend his time trying to remove a spot (say where iodine was spilled) not knowing the nature of it. The man will perhaps try everything when a little ammonia, diluted in water, will remove the spot instantly.

It is possible to remove chewing gum by applying a piece of ice over the gum for a few minutes, until chilled; then brushing the gum completely off the cloth. Removing fruit stains, ink, paint, etc., are all in the day's work.

Furniture of all kinds finds its way into the railroad paint shop and is finished in many ways to suit the surroundings. The furniture may be made of wood, wicker or metal. There is a treatment for each individual piece to make it harmonize with the interior finish of the coach or office.

Passengers usually have time to notice conditions surrounding their temporary occupancy of the sitting-room supplied for their transportation. The appearance value of a clean attractive coach is therefore self-evident and railroad companies are working to this end in their strides for harmony of colors and comfort for their traveling guests.

Kidde Fire Extinguishers

Carbon dioxide fire extinguishers and extinguishing systems manufactured by Walter Kidde & Co. and previously known as "Lux," "Luxomatic," "Selex," etc., will henceforth all be labeled "Kidde." Sole exceptions are the "Rich" and "Richaudio" marine detecting systems. In line with wartime conservation of scarce materials, the "Kidde" label is being made of steel instead of brass, and is narrower than the previous "lux" label.

Surface Treating New Plywood for Duarbility

(PART 3)

BY W. T. SMITH

Physical Testing Laboratory
Roxalin Flexible Finishes, Inc.

VARIOUS ideas, theories, experiences and opinions on the matter of quickly finishing plywood surfaces for a maximum durability are gradually congealing into certain fairly well standardized lines of practice. It is now well agreed that a thin penetrating sealer, a surfacer, and a pigmented top coat are mandatory, with the usual addition of a paste filler for open-pore woods.

An early decisive preference for oleo-resinous types has been dimmed somewhat by current scarcity of the essential oils, and further by the fact that some types of faster drying and more readily available materials are actually more durable under severe testing cycles, and especially on some particular woods such as birch and gum.

What Penetrating Sealer Accomplishes

The penetrating sealer used is generally of the phenolic or alkyd type and is reduced to a thin fluid consistency of perhaps 18% or 20% solids. This sealer may be applied by brushing, spraying or dipping. It performs the function of pene-

A molded "Weldwood" boat hull. Photo, courtesy of United States Plywood Corp.

trating the wood fairly thoroughly to the first bond line below the face, and forms no appreciable surface film. It's function, allegedly is that of combating the attack of moisture on the final finish film. It probably does so, but just how is a matter of conjecture.

As mentioned in a former article on this subject, a moisture-resistant sealer will not prevent the entrance of moisture to the interior of the wood structure. Few, if any, organic coatings will do this. However, it will have the effect of fortifying the bond line to such an extent that the inevitable moisture may not as readily loosen the protective film from the wood—which, after all, may be what we seek. It will not waterproof the wood nor will it prevent, to any particular extent, the failure of the bonding of glue bonded plywood from exposure to excesses of moisture.

The nature of the conventional succeeding coat, a highly pigmented surfacer will necessitate some such preliminary preparation of the surface to bolster what is not notably good adhesion under some adverse conditions. Since this sealer is a film-to-wood bond line protection, it is advantageous, in the interest of sustained adhesion of the surface protecting coats, to keep its consistency thin so that it will not form an appreciable surface film, even with two applications.

Where Sealer May Become A Protective Coat

A possible exception to this will be in the case of the interiors of closed aircraft, where the sealer coatings will form the entire protection for the surface. In this case the thin sealer is sometimes fortified by the addition of aluminum powder, thus making it a true film-forming surface coater. The exact efficacy of the leafing of the aluminum in such usage would seem to leave some room for discussion. In any event, the presence of the penetrating sealer itself offers protection against the free moisture of condensation in the interior of closed aircraft.

With numerous war and civilian products being made of molded plywood, most of which is for outside service, more needs are developing for suitable weather protective coatings and camouflage painting on this plywood.

★ ★ ★

As explained previously, the sealer will not actually prevent the entrance of moisture to the interior of the wood structure, but it may, as indicated in some tests, release the absorbed free moisture more rapidly due to the fact that the microscopic fibers themselves are impregnated with varnish, which reduces their capillarity.

Dipping; Brushing; Spraying

Dip application of penetrating sealers is satisfactory in many cases where it is feasible to immerse the part, and imperative in the case of closed members without free access to the interior. Dip application is, of course, attended by the usual difficulties of maintaining a uniform consistency of material and by the fact that a relatively large amount of sealer must be kept in the tank.

Brushing is entirely satisfactory where the time and labor factors permit . . .

Spraying will be attended by the inevitable proportion of waste material, and care should be taken to avoid over-atomization or too high

air pressures. Any semblance of dryness in application or of a preliminary "laying up" on the surface is fatal to the application of a penetrating material. Spray application must be at as low an air pressure as is practicable in order to flow on the material as wet as possible.

Penetrating sealers are just what the name implies. A free drop of the material, allowed to fall on the raw wood surface, should disappear quickly. Properly formulated penetrating sealers will pass, in an entirely wet condition, through yellow birch heartwood, in longitudinal direction (with the grain) at a rate of approximately 1-in. every ten seconds.

Recoating; Sanding Sealer

Such complete penetration, and the fact that the succeeding coats are usually of a similar nature, permits the common practice of recoating these sealers in a relatively short time, and before they may be actually dry. They are usually recoated with the same material in about an hour, and with the succeeding surfacer material in perhaps two to four hours.

While a light scuff sanding may be desirable on certain woods, following the sealer coat, this smoothing operation can be performed effectively only after the sealer coated surface is thoroughly dry. Even with quick-drying sealers, you may need to allow an air-drying period of 8 to 12 hours—or two hours of force drying at 140° F.

Type of Filler Needed

The function of a paste filler on open-pore woods, such as mahogany, for outdoor exposure is exactly the same as that on furniture made of the same wood. While the function is the same, the filler material is not. Conventional furniture fillers contain too much nonfunctional inert and are usually too short in vehicle for satisfactory use on outdoor surfaces. Regretably, some ardent fabrications of plywood finish have leaned far the other way and offer, as a "filler", what is literally a spar-type varnish loaded with inert. These materials defy any normal attempt to wipe or pad them and are usually removed with a knife or scraper.

There is no sound reason why a filler cannot combine the maximum of outdoor exposure resistance with at least a reasonable amount of the working properties that furniture finishers demand for their purpose. To define "workability" in a filler for any purpose—the filler film, when flashed off to a mealy consistency and when padded with a light rotary motion with the finger tip, will deposit itself as a smooth film on the finger and leave the wood pores completely filled and the surface perfectly clean. If the material offered as a filler does not attain a mealy consistency to the extent of permitting it being padded and cleaned with a coarse rag pad, it is not a suitable filler.

Applying the Filler

Specially formulated fillers for outdoor exposure will be less flocculent or fluffy in consistency and more toward the "sand and water" consistency than are the conventional furniture materials. They cannot carry non-functional inerts and extenders such as earth pigments, magnesium carbonate or clay. They will consist of the correct vehicle, in the proper proportion, and the particular inerts which have the property of entering the pores and staying there.

After being applied, these fillers are usually allowed to dry from

two to four hours before being coated with a surfacer. Incidentally it has been proved that, in the case of mahogany, the use of the penetrating sealer is superfluous with a properly formulated filler. The employment of all three preparatory materials—the sealer, filler and surfacer on all woods is like the wearing of both belt and suspenders; pessimism or habit.

Wiping fillers for use under surfacer coats for outside exposed finishes need not be as clean and complete as for clear furniture type finishes. A few smears on the surface are entirely harmless and a scuff sanding on the dried surface is always advantageous, since graying of pores is not a problem. The length of time the filler may be held "open" for working after it is put on the surface is dependent, as in all fillers, on the solvent used for cutting back the paste. It is necessary only to adjust the solvent as pertains to its evaporation rate to the point where the area being covered permits the worker to reach the flashed-off material for wiping at the proper consistency without loss of time.

Surfacers for Plywood

Surfacers, performing their conventional function, are generally applied at a solids of about 40% or 45%, and usually at a slightly thinner consistency than for use on on metal. There are several reasons for this. One may be the time-honored adage that "two thin coats are better than one heavy coat". Some manufacturers actually recommend the splitting of the surfacer coat into two applications. While this is unnecessary, the idea has foundation. Such practice permits a scuff sanding between coats, thus insuring a smoother final surface and reducing the amount of final sanding necessary, as well as avoiding the possibility of pull-outs from protruding fibers or specks of dirt.

Again, and especially in the case of resin-bonded plywood, a heavy wet coat on a porous wood may result in a most startling rash of bubbling and pinholing, due to the fact that none of the penetrating solvent vapor is dispersed gradually through the mass of wood, but rebounds from the impervious bond line at the back of the face veneer and emerges in force through the partially dried film. Fortunately this phenomenon is peculiar largely to lacquer types of material.

The thin application is further justified by the fact that open-pore woods, after the foregoing operations, are quite well sealed and surfaced already. Denser woods, with the use of a sealer to stop excess suction, require relatively little surfacing when compared to other conventional applications of surfacers, as on sand castings. Retention of a minimum of weight, as in aircraft work, is another reason for keeping the outdoor plywood finish relatively close to the wood.

Sanding the Surfacer

This writer has not seen a surfacer, adapted to outside plywood finishing, that can be sanded satisfactorily with less than 16 to 18 hours drying; in other words, overnight drying, or the equivalent. The equivalent, of course, would mean a force drying at 140° F. for two to four hours. Sanding of durable surfacers for a maximum of outdoor exposure is never of the "easy" or rapid category. These coatings are usually more or less tough and while they may be dry-sanded with a sharp abrasive paper, such as

5/0 aluminous oxide or silicon carbide, wet sanding will be more satisfactory and usually more economical. It produces a minimum of scratching, no dust, and will prove economical of abrasive paper. It is imperative that the water used must really wet the waterproof abrasive paper dipped into it. If the water "crawls off" the paper promptly, the water is too "hard" and must be treated with a commercial water softener, washing soda or borax. The fear of getting too much water into the surfacer coat and of a possible detrimental effect on subsequent coats, is usually unfounded.

Filling Cracks, Nail Holes, Etc.

The drying of the surfacer coat will usually bring a surprise to the woodworker. The most carefully joined, fabricated plywood structure will generally show an unexpected and amazing array of nail holes, pits, cracks, open joints and tool markings which the surfacer coat will not erase or fill. Some form of puttying or spot glazing operation will be necessary.

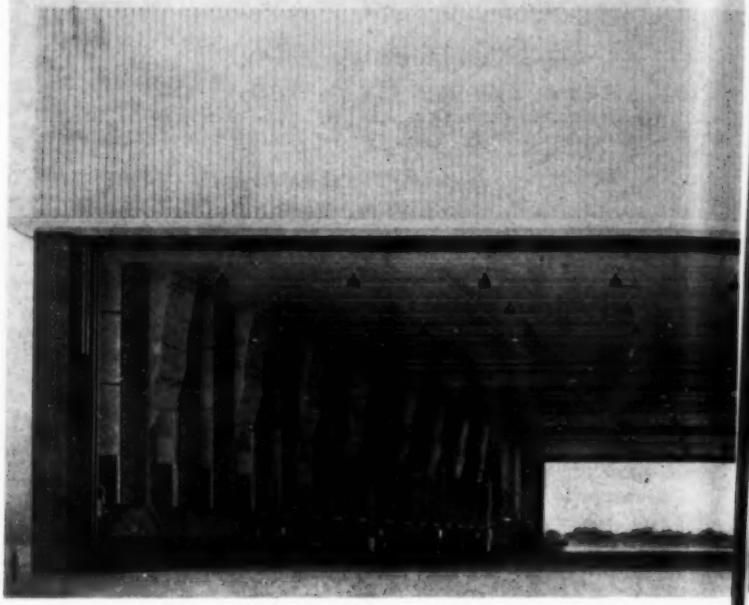
In the interest of speed, as well as in the bonding of the putty, it is well to do this puttying while the surfacer is drying, starting perhaps an hour after its application when it has flashed off and set sufficiently to withstand light handling. The various techniques of applying putty range from the use of thin knives or spatulas to a flexible scraper made of thin plastic. The putty then dries with the surfacer and is reduced with it to a common surface in the sanding.

Top Coats Are Important

Top finishes for exposed plywood are usually of phenolic or alkyd type and are applied in one or two coats. Cross coating in the interest of uniformity is recommended as in the case of almost any color coat on flat surfaces. Surprisingly enough, the quality and nature of the top coat will be a fairly reliable criterion of the durability of the entire finish. While it has been said that a finish is no better than its foundation, *the top coats are equally or more important* in many finishes to be exposed to extremes of moisture and temperature, in addition to ultra violet over long periods of time. Finishing systems varying only in the type of top coat will vary consistently in accordance with that variation alone. Ultra violet and infra-red rays, as found in sunlight or accelerated simulations of it, will open an entrance for moisture as well as exposing any tendencies to excessive chalking or alligator checking. The selection of the top coat should probably command more care, in the interest of durability than any other element of the finish.

Drying of such top coats will range from six to 24 hours or more. The elapsed time for complete application of a durable plywood finish will range from about 24 hours to perhaps 72 hours, depending on the type of material, when air-drying alone is used. With the use of forced drying it is quite possible to reduce this figure to perhaps eight hours for the complete application.

Plywood finishes, to serve the drastic requirements imposed upon them today, must be specially formulated and tested for the specific purpose intended. Finishes and practices that have served merely similar purposes in the past are frequently inadequate for the protection of fabricated wood which is used as a replacement for metal.



View through the enclosure, with end doors rolled up to permit the entrance of bombers.

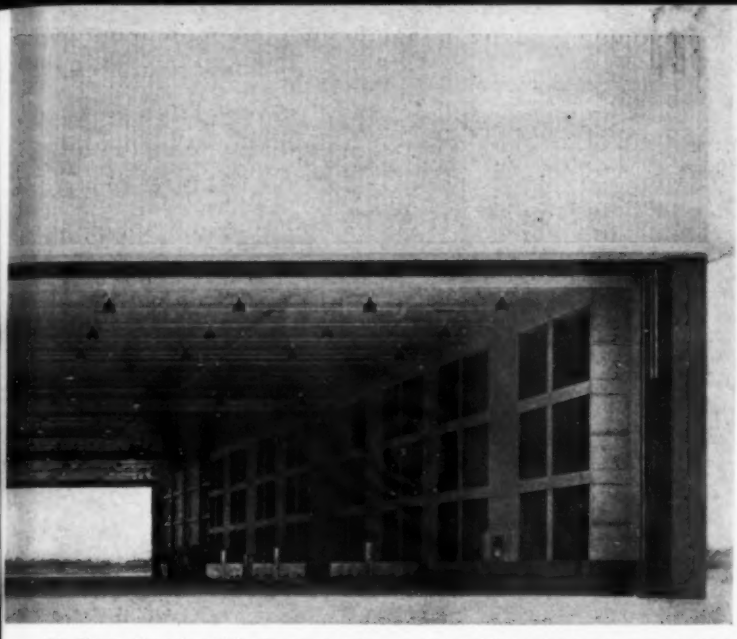
Largest Spray Painting E

ONE OF the many unusual features of two recently completed mammoth bombers assembly plants in the Southwest is the provision made at each plant for a paint spray structure large enough to permit the painting—after complete assembly—of the huge bombing planes turned out by the plants.

No paint spray buildings of equal size have ever before been constructed. At each plant the enclosure in which the assembled planes are painted is 150-ft. wide, 200-ft. long and 35 ft. high. A partition which can be lowered from the ceiling to the floor makes it possible to divide the enclosure into two sections, each large enough to handle an entire plane.

The size of the enclosure at each plant, however, is less remarkable than the ventilating system which was designed to provide a means of exhausting the paint laden air, and replacing it with washed and filtered air. Such a system was required both to protect those handling the spray guns from spray and fumes, and to elminate the fire and explosion hazard.

The ventilating problem was solved by designing a system



Air filters, through which air enters enclosure, are at left; exhaust units are at right.

Enclosures for Bombers

Ventilating system supplies washed, warmed and filtered air at rate of 700,000-c.f.m.

which draws 700,000-cu. ft. of air per minute from the outside atmosphere, washes it, warms it, filters it, draws it across the enclosure in an even flow, washes out the pigment, and exhausts the air into the outside atmosphere again. There are eight air supply units and eight exhaust units.

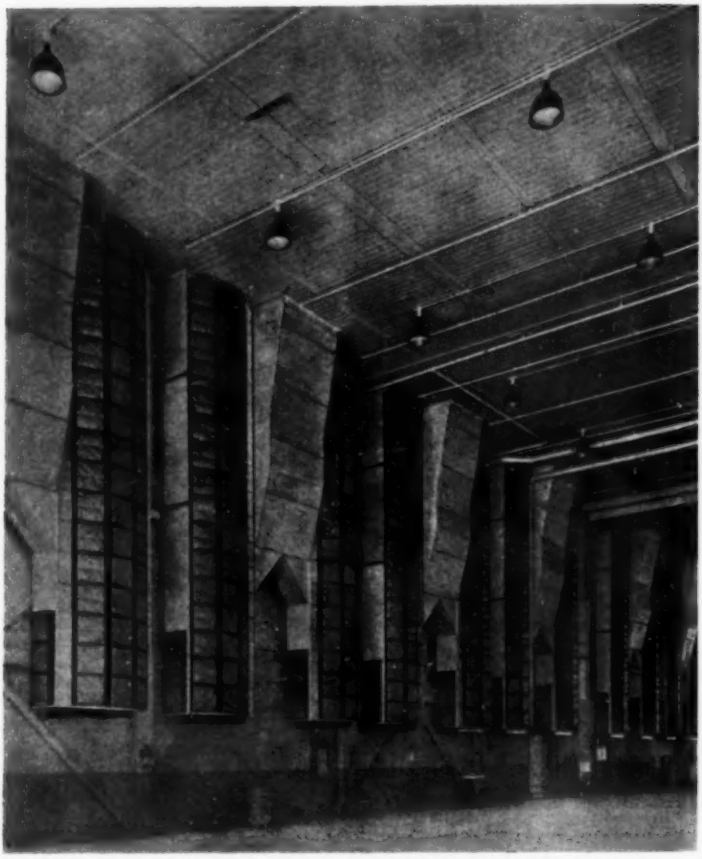
For every pound of paint sprayed, there is supplied 5250-lbs. of air and 6466-lbs. of water. This is about five times the paint-air-water ratio of comparable commercial installations. It takes a crew of six men about two hours to paint a plane. Twenty-five gallons of paint are required.

Supply Units Mounted in Roof Trusses

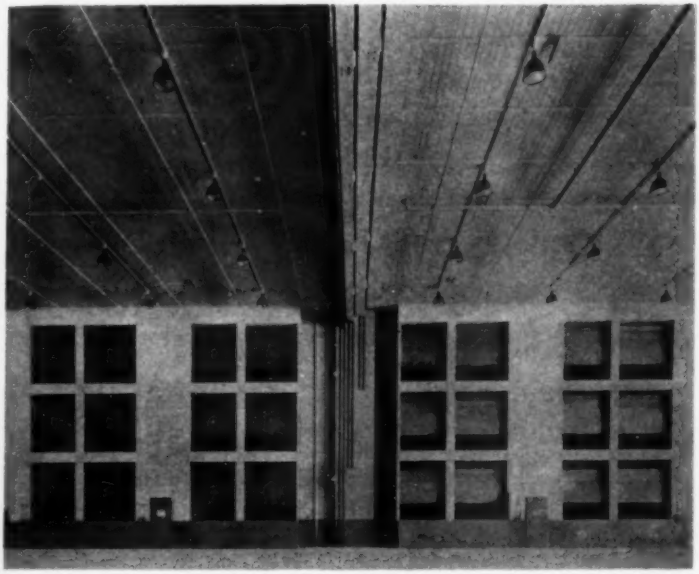
All equipment for the air supply units is mounted in the roof trusses, taking fresh air from near the roof line. Fans draw the air in through automatic inlet louvres. After being tempered by steam coils, washed, and re-heated to a constantly controlled temperature

of 80° F., the air is evenly distributed over the entry wall through a system of dampered ductwork.

Admission of the air into the spray enclosure is then made through replaceable glass fiber air filters. These filters consist of mats of fine, interlaced glass fibers coated with a dust-catching adhesive. Their function is to strain out any particles of dust or pollen that may remain in the air stream. They are arranged in 16 vertical bay panels, each containing 57 filter cells. Each cell pro-



Glass fiber air filters arranged in 912 cells, each cell containing four filters, line the wall through which the washed, warmed and filtered air enters the enclosure.



Some of the exhaust units which clean the paint-laden air and discharge it into the outside atmosphere. Notice disappearing partitions at center above.

vides room for four filters. Thus 3648 filters are employed to strain the air entering the enclosure.

The ductwork and filters are so arranged that the clean air enters the enclosure in such a way as to provide an evenly distributed flow from side to side, from floor to ceiling. Overspray from the paint spray guns is carried horizontally by the flow of air from the point where it is produced, across the width of the enclosure, to the nearest exhaust opening at the opposite side. The lighter overspray does not settle in traversing the enclosure.

The eight exhaust units are arranged to draw the air out at three levels, thus helping to maintain even distribution. Each section of each unit has a constant flow of water over its flood sheet, the surface exposed to the room.

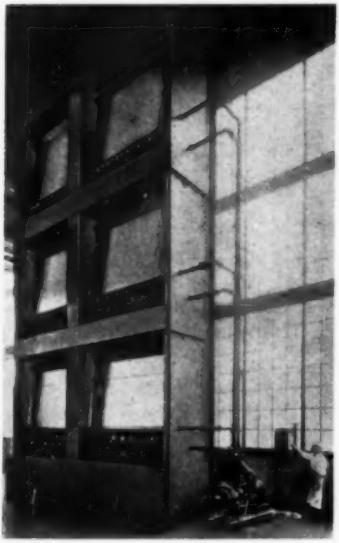
A suction-draft exhaust fan, located outside of each unit, draws the paint-laden air through a series of conical, high-pressure water sprays, confined in circular orifices. Centrifuge tubes completely separate the water and sludge from the air and deposit them in a sludge tank below. Only clean air passes through the exhaust ducts and fan.

The sludge tank for each unit holds 2000 gallons of water. The water in these tanks is continuously re-circulated through the units by pumps mounted on the

floor in the spaces between them. The only loss of water is from evaporation. Water spray nozzles are in plain sight and readily accessible. There are no concealed eliminators that require removal for cleaning.

Water Sprays and Filters Present Fire Barriers

Should a fire be generated within the enclosure it would be impossible for it to pass through the water sprays and spread through the exhaust system. The glass fiber filters through which the clean air enters at the opposite side of the enclosure do not support combustion, and would tend to act as a barrier to fire spreading into the supply system. Further, the dust-catching adhesive with which the glass fibers are coated carries underwriters' approval as a material without smoke or fire hazard.



One of the exhaust units in the fabricating shop, prior to installation.

The entire system is controlled by electric push buttons within reach from the paint floor level. Each of the supply and exhaust units is independently controlled. Any combination of the units can be operated together. Automatically controlled dampers on both the supply and exhaust units close when a unit is shut down, and open when it is started up again. When no painting operations are in progress, although the outside temperature is such that heat is needed in the structure, about 10% of the capacity of the supply air is drawn in through one unit to maintain a working temperature.

The ventilating systems for the paint spray enclosures at the two bomber plants are practically identical.

Photographs and material for this article were furnished by the Bureau of Industrial Service, Inc., at request of the following manufacturers: The R. C. Mahon Co., Owens-Corning Fiberglas Corp., The Austin Co., Truscon Steel Co.

Magnus Chemical Co. Organizes Machine Division

The organization of a Machine Division for the manufacture of mechanical metal-washing machines, pickling machines, driers, ovens and burnishing equipment, is announced by the Magnus Chemical Co., Inc., Garwood, N. J. The Magnus organization is well-known in the industrial field as a manufacturer of cleaning materials.

A staff of experienced draftsmen and metal fabricators have been assembled and are at work on the manufacture of a number of machines for important war plant installations. A complete engineering service is offered, covering everything from the original problem through finished installation to practical operation.

. . . NOW IS THI TIME TO HELP

American boys on thirty-one "fronts" all over the world.

We are therefore all out for war—w the right materials for war goods and t right program for the war effort.

Stille-Young will uphold its standard dependability in war as in peace.

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Tiny firing instruments t

Official U. S. Signal Corps Photo

DeVilbiss Spray Equipment speeds the output of ack-ack gun parts!

● Anti-aircraft guns by the thousands are being added to our defenses. And DeVilbiss Spray Equipment is helping to turn them out at unprecedented speed. It is used to paint heavy gun mounts, barrels, shells and delicate firing instruments—all the parts and assemblies of this essential anti-aircraft armament.

DE VILBISS

...heavy gun mounts...

DeVilbiss is devoting its entire production to building modern spray systems that speed the output of all kinds of fighting equipment—shell fuses, small plane parts, bomb cases, helmets, aircraft engines, jeeps, tanks, submarines, bombers and cargo carriers. And right now on war work, every second counts.

We're on guard to prevent finishing bottlenecks in full-out war production. If your plant has a war contract, there's a modern DeVilbiss Spray System to help you speed up finishing.

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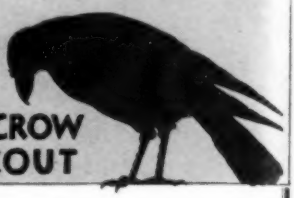
Canadian Plant: WINDSOR, ONTARIO

JETAL



BLACK AS A CROW IN A BLACKOUT

HARDEST AND MOST PENETRATING BLACK OXIDE FINISH — THE WARTIME DRESS FOR PRODUCTS OF IRON OR STEEL

The JETAL Process — original, patented black oxide finish — is an ideal substitute for nickel, zinc, cadmium and tin plating. Deep-penetrating, non-reflective, rust-resistant.

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Ask our research staff to help you with your protective coating problems. Consultation service without obligation. Samples JETALized without charge.

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Finishing Wood Pulls, Knobs for Furniture

BY H. W. CHESTER

DUE TO Government restrictions on the use of metal for furniture pulls, handles, knobs, etc., most of this kind of hardware is out for the duration of the war. This is particularly true of the brass and brass-plated hardware, and perhaps many other kinds too.

While many furniture manufacturers have been using wooden pulls of their own manufacture on most of their modern designed suites, they now find that they will have to manufacture the handles, knobs, etc., for their borax and borax modern suites. It will be almost impossible to obtain most types of this hardware.

This "hardware" can be made from most any type of hardwood (preferably red gumwood). By bandsawing, shaping and carving, and by properly finishing and decorating, it can be made not only serviceable but very attractive.

It is more difficult and more expensive to finish handles for borax and borax modern furniture than handles, knobs and pulls for modern suites. While most of the more conservative types of modern suites use wooden pulls and knobs of the same finish as the suites, borax suites require flashy highly decorated accessories.

Apply Sealer Coat; Sand and Steelwool

To start the finishing on the bare wood, spray on a coat of wood sealer (either lacquer or varnish type). After this dries thoroughly, sand the surface with No. 6/0 sandpaper and rub well with No. 3/0 steelwool to make the carvings, routings, etc., really smooth. Then spray on a coat of bronze (select one of any of the several shades). This bronze comes in powder form and can be mixed with a special lacquer or oil-type bronzing liquid. Of course, bronze, powders can be mixed in ordinary lacquer sealer, lacquer or varnish, but I have found that bronzing liquids made especially for the purpose are better.

NOTE—I understand that no more bronze powders will be obtainable after stocks now in manufacturers' establishments are exhausted. But dyed lacquers can be bought in most any color desired. These work very well and can be used in several different ways to produce different metallic effects. There is also a powdered lead that can be bought. It resembles aluminum. This can be put in lacquer and sprayed on. Then follow with a sprayed coat of lacquer that is bronze in color. This

gives a bronze effect that is hard to distinguish from real bronze.

How to Produce Decorative Effects

If a two-tone decorative effect is wanted, material of different color, such as red lacquer or oil enamel, can be brushed on certain parts to produce the proper decoration.

Lacquer and oil enamels in defferent color combinations may be used to finish this type of "hardware". Glaze stain can be used over most any color combination; and by wiping off the stain from high parts and leaving a small amount in router lines and low places in carvings, etc., a very good highlighted effect can be obtained. This stain also tones down the bronze so that it does not show too bright. A clear coat of lacquer or varnish (depending upon the type of under-coat) should be used as the final coat, as this makes the finish last much longer on the handles.

In finishing these handles, pulls and knobs in large quantities, which is quite a problem where large production is desired, I would suggest the use of lacquer and lacquer sealer, both for the under-coats and top coats, as it is more durable and dries much faster, thus speeding up the finishing schedule.

How to Hold and Spray Small Items

These handles or knobs can be placed on a large board which will hold several dozen, depending upon their size and shape. Finishing them this way saves handling each one separately. Sharp pointed nails driven through the board can be used to stick these small pieces on, so as to prevent them from moving out of line or sliding off the board. It is almost impossible to spray small knobs unless they are stuck temporarily on a nail or something to hold them, as otherwise air from the spray gun would blow them off the board.

While we may find it more expensive to finish this type of wooden "hardware", we must resort to something of this kind if we manufacture this type of furniture, which is in great demand at the present time.

Facts for Finishers

DID you know that . . . .

Butanol (normal butyl alcohol) is not in itself a lacquer solvent but the addition of even a small amount of a true solvent such as butyl acetate, changes it into a rather good lacquer solvent.

* *

Gums and resins differ, chemically speaking, in that the former are of the same character as sugars and carbohydrates while the latter are related to the essential oils and terpenes.

* *

There are over 100 different organic solvents in more or less common use in the field of organic finishing.

* *

Varnish was named after the beautiful wife of an Egyptian king who ruled in the third century, B. C.

* *

When one gallon of lacquer, or paint, etc., is mixed with one gallon of thinner, two gallons of mixture does not always result. There

RELIANCE FINISHES

are engineered to meet

WAR PRODUCTION SPECIFICATIONS

FOR EXAMPLE—

OQMG No. 63-B QUARTERMASTER CORPS BUNK BEDS

We are supplying materials to pass the severe tests in this specification. Hundreds of thousands of our armed forces will sleep on beds finished with Reliance products.

ES-680 QUARTERMASTER CORPS TRUCK FINISHES

Whether it is Class 38 Clear Wood Lacquer, Class 2 Refinishing Primer, Class 1 Rust-Inhibiting Primer, or Class 4 Lusterless Olive Drab Enamel that you need, we can supply tested and approved products. Hundreds of thousands of our boys will ride in trucks finished with Reliance products.

NAVY & AIR CORPS LOCKERS, DESKS AND FILING CABINETS

Large quantities of wooden articles of all kinds are being finished with Reliance products that have been engineered to meet the needs of individual specifications for each item. Hundreds of thousands of our officers will work at desks and use files and cabinets finished with Reliance products.

Above are only a few illustrations, by no means a complete list. Whatever your problem may be, refer it to us with a copy of the specification involved.

LOOK TO

RELIANCE

FOR THE BEST FINISH

RELIANCE VARNISH CO., INC., LOUISVILLE, KY.

IF

SHORTAGES of vital ingredients in product finishes leave you stymied

IF

PRIORITIES have affected the design and quality of your product

IF

FREEZE ORDERS have played havoc with your basic raw material specifications

IF

SUBSTITUTION in drastic measure is the only solution to staying in business

Billy Wrinkle so

SPEED WAR CONTRACTS
Wrinkle Finish is being used on many pieces of war equipment to speed delivery and assure greater surface protection. Write now for your copy of "New Wrinkles in Finishing."

NEW WRINKLE INC.
314 W. FIRST ST. ··· DAYTON, OHIO

may be, and usually is, either a slight loss in volume or a slight gain in volume, depending on the material and the thinner.

* *

Acetone and normal butyl alcohol are produced in large quantities by a process of fermentation.

* *

One solvent may have a higher boiling point than another and yet evaporate more rapidly.

* *

Fungicides are often incorporated into paints to discourage the growth of fungus which would destroy the paint.

* *

Large bridges are being painted continuously. It takes so long to paint some bridges that when one end has been reached the other end needs repainting.

* *

An experienced paint color matcher can detect almost infinitesimal differences in shade, tint or color.

* *

Most industrial finishing materials are today tailor made to suit the particular requirements of each individual customer.

* *

One pound of aluminum powder, added to one gallon of vehicle, will give approximately one and one twentieth gallons of mixture.

* *

Finely divided metallic gold was the first bronzing powder. It was mixed with vehicle and used to adorn the carriages of very wealthy people.

* *

It is safest, cheapest and best in the long run to use the thinner that the finishing material manufacturer recommends. Experimenting is all right in a research laboratory. It does not always work well in a finishing room where precious time, material and labor are at stake.

* *

More people would treat nitrocellulose lacquers with greater respect if they realized that nitrocellulose is a cousin, chemically speaking, to gun cotton. While nitrocellulose is not explosive, it is highly inflammable and deserves careful handling.

* *

In cleaning brushes, the most foolproof cleaner to employ is the thinner which is used to reduce the material being applied with the brush. For example, turpentine with paints, lacquer thinner with lacquers, etc. An attempt to save a few pennies in cleaner may be the ruination of many dollars worth of brush.

* *

If an occasion does arise where it is desired to apply a finishing material to glass, it must be remembered that cleanliness in addition to being next to Godliness, is also absolutely essential if the finish is to adhere to the glass. Make certain that the glass is completely clean, or the finish will peel.

* *

Carbon dioxide fire extinguishers are recommended for general use where there is a possibility of finishing materials catching fire.

* *

Organic finishes may be divided into two general groups, namely trade finishes and industrial finishes. The former, the so-called "shelf goods", are usually sold to painters through retail outlets, distributors, manufacturer-owned

PERHAPS HERE'S THE ANSWER TO *YOUR* FINISHING PROBLEMS

TO HELP YOU solve those tough finishing problems in connection with war production work, a complete line of industrial finishes is available from our modernly equipped, new paint plant.

Our long experience in developing the exclusive varnishes and lacquers for Permite Ready-Mixed Aluminum Paints is now devoted to supplying U. S. Government specification finishes to war production manufacturers, for product finishing and for many interior and exterior uses.

The Permite Line of Industrial Finishes includes clear and colored ammunition lacquers, camouflage paints, zinc chromate primers, olive drab enamels, rust inhibitors, mixing varnishes and casein water paints. We can also supply Permite Aluminum Paints on WPB allocation.

Your inquiry will receive our prompt attention.

ALUMINUM INDUSTRIES, Inc., Cincinnati, Ohio

Distributors in Principal Cities

PERMITE *Industrial* ***FINISHES***

stores, etc. Industrial finishes, on the other hand are usually sold direct to users for application on items manufactured on a production basis.

* *

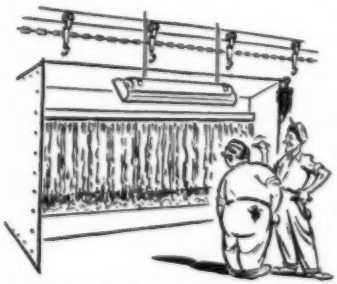
One of the major problems of finishing material manufacturer is what is known as package stability. It is obvious that a finishing material should require a minimum of stirring to reincorporate the pigment after storage, and that there should be no evidence of instability such as jelling, seediness, livering, etc.

* *

The best test for any finish is a test under actual conditions.

* *

In making hiding power evaluations, it is essential that an organic finishing material be completely cured (dried or baked). Evaluations made on wet films may give rise to errors, since a finishing material may either gain or lose opacity on passing from the wet to the dry state.



"Bill, that new water-wash booth reminds me of my honeymoon."

"How so, Fredie, was it pouring rain all of the time?"

"No, we visited Niagara Falls."

(Thanks to G. L. Gaston).

Plastic Finishes

LAMINATED plastics of the phenol-impregnated type require special finishing treatment. Some finishes have been developed for this type of material that are both protective and decorative. One such material, available in various colors and applicable by either brush or spray, dries in 2½ minutes at 275° F. under infra-red lamps, or will dry in 5 minutes at 225° F. Finishes that may be manipulated with such a high degree of convenience on this type of work do much to extend plastics markets.—G. F.

Heats Cleaning Solution Better

WE ARE becoming quite accustomed to electric heat applied for drying via infra-red lamps; and, of course, electric heat is used in many baking ovens. But did you ever encounter its use in connection with cleaning and degreasing tanks used for cleaning metal parts prior to finishing? It is very efficient. In a degreasing and cleaning tank, the material cut from the metal by the solution settles to the bottom of the tank, forming a layer of sludge. The result is that with heat applied to the bottom of the tank, as is often the case, the sludge insulates the tank bottom against the passage of maximum heat to the solution. Now if you place electric immersion heaters directly into the tank, you are applying your heat above the sludge blanket. Manufacturers of electric heating devices furnish immersion heaters adapted for this purpose. —O. MORRIS.

● Many an Air Corps Repair Dock wears a coat of Johnson's Paint. These metal "nests" to which American "eagles" return for periodic checkup NEED such protection . . . not only against corrosion and rust, but also to hide them from enemy eyes.

Many ship surfaces, tanks, Army bicycles, now have the protection of approved Lustreless Olive Drab Enamel made by S. C. Johnson & Son, Inc. And well-known Johnson's Wax-O-Namel . . . a special wax-fortified paint . . . is playing its part in the war effort, too, being used on life rafts, cartridge and powder storage tanks, on shell boxes, on Victory bicycles.

Are you a war materials contractor with paint problems? Our Product Finishes Division is well equipped to supply a great variety of paints and finishes, or develop new coatings and processes for tough jobs. Write

S. C. JOHNSON & SON, INC.
PRODUCT FINISHES DIVISION
Department IF-112,
Racine, Wis.

LET US HELP YOU

The simple, sure way to avoid confusion, delays and rejects is to standardize on EGYPTIAN FINISHES developed to meet the requirements of Government specifications. Years before Pearl Harbor our chemists were making EGYPTIAN FINISHES to meet Government specifications. Our years of experience in this work have particularly fitted us to help you today. You can depend on EGYPTIAN to give you the finish that Uncle Sam wants.

SERVICE STILL COUNTS

Service has been the keynote of our business for half a century. In spite of present unprecedented manufacturing difficulties you can rely on us to fill your order accurately and promptly, whether you are an old or new customer. Get in step with EGYPTIAN and you'll keep in step with Uncle Sam.

EGYPTIAN FINISHES

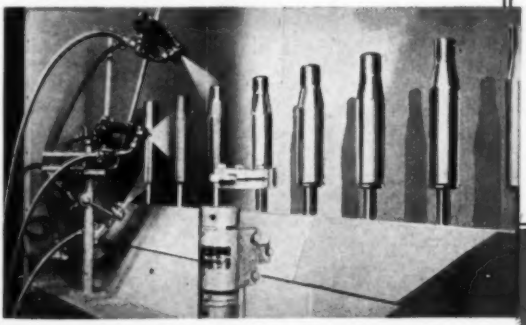
EGYPTIAN
Superior FINISHES

For Example:

—take AXS-736

EGYPTIAN Clear Finish For STEEL Cartridge Cases

- Here is a highly specialized finish for dip or spray application followed by a ten minute bake at 350° F.
- Retards corrosion or reaction between the casing and propellant material.
- For use on both exterior and interior of cartridge cases.
- A material which meets all the requirements of Specification AXS-736.



These are a few of the more important Government "Specs" which we can furnish. For more complete list send for "Spec." book.

ES-680
SYNTHETIC TYPE
PROTECTIVE COATING

★ AXS-736
CLEAR FINISH
FOR STEEL CARTRIDGE CASES

AXS-680
LUSTRELESS LACQUER ENAMEL
FOR AMMUNITION

AXS-684
TYPE I and II
LUSTRELESS PAINT FOR AMMUNITION

3-162-A
NITROCELLULOSE LACQUER ENAMEL
FOR AMMUNITION

P-27-b-2
ZINC CHROMATE PRIMER

84
ZINC CHROMATE PRIMER

AN-TT-P-656
ZINC CHROMATE PRIMER

PXS-979
LACQUER ENAMEL FOR AMMUNITION
(CELLULOSE TYPE)

SEND FOR THIS "SPEC" BOOK

The second edition of our loose-leaf book "United States Government Specification Finishes" is just off the press. It contains information concerning specifications for the more important finishes used on equipment for all branches of the service.

An EGYPTIAN FINISH is now available for a wide range of war products. Sheets containing new and revised specifications are sent out as such changes occur. Write today on business letterhead for your copy of this invaluable purchasing guide.

Just ask for Government "Spec" Book 1F-11

THE EGYPTIAN LACQUER MANUFACTURING CO.

Rockefeller Center **New York**

EGYPTIAN
Superior FINISHES

Yes, French Polishing

ON A MODERN PRODUCTION BASIS

BY EDWIN HOGSTROM

IN THIS article I am going to describe a practical method of French Polishing furniture — a method used in production at the time I was in charge of finishing for a company manufacturing custom-built club-room furniture a few years ago. Although the method may seem long and drawn out, we produced finished tables with tops as large as 5-ft. wide and 10½-ft. long in 18 hours labor time, from start to finish, and for a table that sold for from $250 to $400 each, that was low-priced finishing. The same table, finished in rubbed lacquer, required 15 hours, so the cost of lacquer finishing was not so much lower.

I do not agree with some of your experts as to the mixing of oil with the shellac, as that will surely make a smeary finish that will remain greasy for a long time.

Calls for Expert Workmen

French polishing requires expert workmen, which is the main reason, I believe, why there is not more of this kind of finishing being done today. An expert polisher with the French method will do certain types of furniture even faster than with lacquer—if the work is given to him in the white, and "knockdown"—fitted together but not glued. This is where the cabinet shops would kick because they would have to be extra careful in gluing and putting together the finished polished pieces.

In working on knockdown furniture the finisher should mask all dowels before starting, so that all the cabinet shop will need to do afterward is to remove the masks and proceed with final assembly. It can be done, as I had charge of just such a finishing room and turned out French-polished furniture in production. Any turnings that required French polishing were finished in a lathe—not in the cabinet shop but in the finishing room. We did them that way and found that this method is the best in every respect.

For a 100% French polished finish you start at the bare wood with your French pad and continue polishing until you have a finish built up that is really a straight shellac film. This, I admit, will take a long time and can hardly be called a production procedure.

For a production finish, using the French method, the difference lies in the preparation of the wood before hand polishing. The finish is a true French polish finish, but without the hours of labor that the other method would require.

A COMPLETE FINISHING SYSTEM *for* AIRPLANE PROPELLERS

One of the larger propeller manufacturers recently requested us to design for them a mechanized cleaning and painting system for finishing propeller blades. At the time they found it necessary to use both a day and night shift to turn out the work. After a careful survey of operations and equipment, our engineers planned and built a compact finishing system that dispensed with much of the handling—*and eliminated the night shift work entirely.* Similar systems now are being planned for other propeller makers, or already are in actual operation. Mahon's comprehensive, firsthand knowledge of modern finishing methods is proving invaluable in many additional phases of aircraft production — and, likewise, in many other industries.

Clipping hours—or even minutes — off production schedules is vital to every manufacturer of war equipment. If you have a finishing problem, Mahon co-operation may help materially in smoothing out your difficulty and saving precious production time.

THE R. C. MAHON COMPANY • DETROIT • CHICAGO

MAHON

Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filtered Air Supply Units, Hydro-Foam Dust Collectors—and Many Other Units of Special Production Equipment — Including Complete Finishing Systems.

The Production Method on An All-Walnut Table

As an example, take an all-walnut table with turned legs and a large top. First of all, this kind of wood requires sap staining to uniform the grain. Then a stain of the non-grain-raising type for speed of drying. Walnut is more difficult to finish than the close-grain woods, as it requires the filling operation; the close-grained woods, such as birch, gum, magnolia, etc., do not.

All turnings are filled on the same lathe as is used for polishing. A perfect job is accomplished on these parts because we can wipe the filler into the pores, right up to the top, while the turning is revolving. I prefer to fill over a washcoat, although where the clearness of color and film is not so important, it need not be used.

For a washcoat before filling I used either a 4-lb.-cut shellac (orange or white) reduced 3 to 1 with alcohol, or a lacquer sealer cut 2 to 1 with thinner. One is as good as the other. A light sanding after a short drying, and we are ready for filling.

Filling; Spray Sealer

In filling, use a good fast-drying filler that breaks clean at the tops of the pores and does not smear. Reduce with VMP naphtha or a lacquer diluent (petroleum product) to the consistency of heavy cream (about 10 to 12-lbs. of filler to one gallon of reducer) and brush across the grain, if possible. Let the filler dry as long as possible after wiping, depending upon local drying conditions.

Next comes the sealer coat of either shellac (orange or white, 4-lb. cut reduced 50/50) or regular lacquer sealer (no reduction) which is okay too. I used shellac but I prepared my own from clear wax-free flake stock. I don't know whether or not this can be obtained at present. Wax-free shellac will do also. I used this type of shellac because I did not want the orange cast of the orange shellac, or the white shellac's wax content.

The clear shellac is sprayed on. In spraying this material do not use too much air for breaking it up, as you may cause an orange peel effect to appear in the film and it is hard to get out. Be sure to drain all air separators several times daily, and the compressor tank also. If you still get an orange peel effect, add a small amount of butyl alcohol or butanol to the shellac. Use this with care, as this material acts as a retarder to the shellac and too much may do more harm than good.

In preparing our own clear shellac, we cut 5-lbs. of the flakes into one gallon of wood alcohol. Stir until dissolved and agitate each day for four or five days. Then put it aside to settle. There is hardly any precipitation, but I prefer an amber clear liquid and this is my method of getting it. The shellac is stored in 5 and 10-gallon crocks and jars to prevent any discoloration from metal containers, if used. Keep enough on hand so as to use only the shellac that is 3 or 4 weeks old. When taken from stock, the shellac is reduced with a water-free denatured alcohol and sprayed as previously mentioned.

Begin French Polishing

After the sealer is dry it is sanded smooth and the French polishing is started. A number of

AIRPLANES
AMMUNITION
COMMANDO RAMPS
COMMUNICATION SETS
GAS MASKS · GLIDERS
OPTICAL APPARATUS
PLYWOOD ASSEMBLIES
RANGE-FINDERS
RATION CAN

Here's WARTIME finishing experience to meet your problems

Long before the Japs bombed Pearl Harbor, Murphy Protective Coatings were going on many war products . . . and the list is constantly growing!

Industrial concerns doing war work *knew* that Murphy had what it takes to meet the nation's war effort . . . We have taken a leading part in the making of Protective Coatings for over 75 years.

This long experience, plus the knowledge we have gained in current war work, should prove valuable to you. Tell us your requirements. We'll produce a finish that meets government standards and is keyed to your production methods.

Experienced executives say

"PUT IT UP TO MURPHY"

Get in touch with our nearest office

MURPHY VARNISH COMPANY

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SEARCHLIGHTS
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DENTAL EQUIPMENT
FIRST AID BOXES
PROPELLERS
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MURPHY

PROTECTIVE COATINGS

ANOTHER WARTIME FINISHING HINT

from DuPont

DETERMINE TO SPEE

WATCH CAUSES OF REJECTS TO SPEED WAR OUTPUT

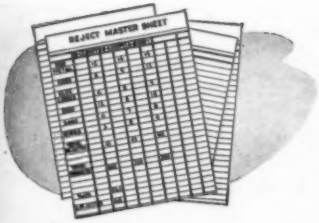
Don't just accept rejects as "necessary evils." By systematically checking up on their causes (such as placing bare hand on metal, illustrated here) and then *removing* these causes—you can cut rejects down to a bare minimum. This will aid greatly in conserving both time and materials.

DU PONT

REG. U. S. PAT. OFF.

Better Things for Better Living . . . *Through Chemistry*

MINE CAUSES OF REJECTS SPEED WAR OUTPUT



KEEP DAILY RECORD OF REJECT CAUSES

Instead of merely lumping all rejects together, tabulate the reason for each individual reject. Supply a printed form (based on your own shop needs) and train the men to use it. This will guide you in taking steps to remove the various causes of rejects.

START A CLEAN-UP AROUND SPRAY BOOTH

One of the biggest single causes for rejects is dirt and dust drawn into spray booth by the exhaust fan, which acts exactly like a vacuum cleaner pulling dirt into booth. Start a clean-up campaign to keep entire finishing area spotless at all times.

MAIL THIS COUPON

Send today for Du Pont help . . . free information and service!

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different pads of various sizes are required to polish varied shapes and sizes of furniture.

When using the French polishing method on assembled furniture, it is difficult to polish into close corners and angles where the legs and spreader join. To overcome this, we made a mixture of one part Venice turpentine to nine parts of 1-lb. cut clear French varnish (refined shellac). Shake well and apply this material to the corners of the article with a soft hair brush, with one stroke of the brush. Do not go back over this material. The material dries rapidly and with a high gloss. When dry, the Frenching pad can be brought up to the Venice . . . . mixture, and a perfect blend will result.

How to Use French Polishing Pad

To prepare a French polishing pad, get a clean soft cloth (lint free) that will retain the liquid and not pack too closely, so that it remains in a fairly loose ball and will allow the liquid to seep through. Cheesecloth is as good as any. Make an average size pad. At first, until you form your likes and dislikes or preferences for various sizes, try one about the size of a tennis ball.

The cover of the pad should be of a material as lint-free as possible. There should be two kinds —one coarse for the first polishing. For the coarse cloth I prefer linen—old and washed goods of the type used in women's summer suits. This will allow more of the shellac to get through onto the work and it will not leave lint. The cover of the finishing pad is of a finer texture, such as old well-washed table linen. Use the same pad; just change covers.

To start polishing, fold back the first cover and pour a small amount of shellac on the top of the pad. Squeeze the pad several times to distribute the shellac inside the pad. If the pad is too wet the shellac will ooze out. Get rid of this surplus by squeezing it out on a small board. Wipe the pad on the board, which will condition the pad for Frenching. Keep this same board, as you will use it often. Always apply added shellac to the top of the pad by unwrapping the cover and pouring a small amount at a time into the interior.

Alcohol and Oil; Use Both Sparingly

Keep a can of alcohol handy and when the shellac in the pad gets too heavy, add a few drops at a time and continue working. A good idea is to use an ordinary oil can and squirt the alcohol on the pad when necessary. Always wipe the pad on the flat board before starting to polish or after adding the liquid. You do this to remove the surplus from the bottom of the pad. Otherwise it will leave streaks in the finish and they will be difficult to remove.

Before applying the pad to the work, add a few drops of oil (lemon oil, paraffin oil or mineral oil) to the bottom of the pad to prevent it from sticking. Do not add the oil to the French varnish itself or to the top of the pad, as the finish made from such a mixture will be greasy. Use only enough oil on the pad to keep it working smoothly.

When applying the pad to the work use a circular motion or a figure-8, changing occasionally to cross strokes across the grain and final strokes with the grain. When

using straight strokes, come down in an arc on the table top and at the end of the stroke leave it the same way. Repeat this procedure until your finish is built up.

Additional Filling

To speed up the finish and also to fill any pores that were not filled in the filling operation, use a small amount of 4X pumice powder or a very fine grade of optical grinding powder on the bottom of the pad occasionally. Be very careful to avoid getting too much of the pumice on the pad, as a little will go far; and too much will leave the finish sandy and will have to be removed before continuing to polish.

It is possible to fill the entire table this way, but the oil used to lubricate the pad would have to be colored with stain in order to avoid leaving the pores of the wood white. Continue rubbing and when a fair finish is built up, change the cover of your pad to the finer material, but do not add any more shellac; add only alcohol and continue polishing. Use oil only to prevent the pad from sticking. After a while there will be no need for more oil. In fact, you will have to wipe your pad on the board from time to time to remove the excess of oil that the alcohol pad will pick up.

The pad will gradually lose all the shellac and eventually you will be polishing with an alcohol pad only. This will smooth out the finish to a glass-like appearance. It is practically impossible to obtain in any other way.

For a Finer Finish . . .

The method just described is a one-application finish. For a finer finish, let the article dry over night, sand lightly with No. 400 sandpaper (dry) and proceed as before to build up the finish to any desired thickness.

You can apply as many coats as are desired. If after an overnight drying of the film there should be a sweating out of an oil used as a lubricant, it can be removed with a straight alcohol pad. Be very careful and do not use a wet pad. A good idea is to wet the pad and ring it out as dry as possible. The wet alcohol will be gone but the fumes will still be there. Polish the same way as before, until the finish is dry and hard, or until you can rub your fingers across the top without leaving any marks.

This will complete the table top. For the legs and cross members, polish the same way but usually they do not need as much attention. Any pieces that lend themselves to polishing on a lathe, do so, as this will result in faster production.

Use Benzoin Solution

For custom furniture that requires something extra and where the cost is not as important as the results, it is possible to obtain an even finer finish by applying a coat of benzoin solution in the same manner as the shellac. This solution, applied as just described but in a more reduced state, produces a finer, harder and much glossier finish.

You will probably have to make up your own material, as I have never seen any on the market. Our benzoin comes in rock like form and has to be crushed before it can be dissolved. I used to put about 5 or 6 pounds of the gum on the cement floor and pound the rocks into a fine powder with the end of a 2x4-in. piece of lumber, or any

other article suitable to crush them. Mix the powder in the proportion of 5-lbs. to one gallon of alcohol. This material requires frequent agitation until dissolved. Store the same as the shellac and keep enough on hand so as to use only what has been prepared for a considerable length of time. Draw the clear liquid from the top and reduce with alcohol in the proportion of four parts of alcohol to one of benzoin. Gum benzoin has a very sweet odor and is pleasant to use. The results you get will pay for the extra work.

If you wish to hurry the removal of oil from the finish of either shellac or benzoin, you can do so by using Vienna lime which is a fine powder. Use very little at a time—a trifling bit dusted on the work—and use your last pad to pick up the powder. Pick up a small patch of powder at a time and work it over the top until all of the lime is picked up. If the top streaks when you pull your fingers across it, repeat the lime operation. Any accumulation of lime on the bottom of the pad can be removed by reversing only the cover on the pad and continuing.

Additional comments on the same subject, by Wm. F. Behlen, Lyndhurst, N. J.

I have been contacting the finishing trade throughout the metropolitan New York district for the past 23 years, and have reached the conclusion that the best finishing is done by the French polishing method. Several reputable concerns use this method of finishing on their more expensive pieces and on their better class of work. Antique reproductions and repairs are always finished in this manner. Prominent antique dealers in New York City use no other method of finishing.

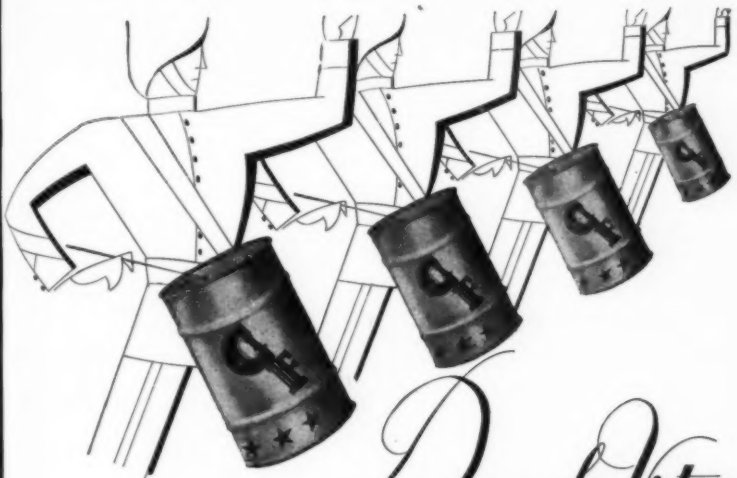
It appears to me that many concerns throughout the country do not know how this work is accomplished, and haven't the skilled labor to do it. A piece of furniture finished by this method retains its brilliant finish indefinitely. It never checks nor is damaged by changing weather or other climatic conditions that affect other finishes. By using shellac the surface is not waterproof nor alcohol-proof, yet it is mar-proof. One finish manufacturer in New York City has developed a waterproof French polish which goes on with greater ease of application. . . .

I will try to explain the method used by the various finishers in this city, as I have seen them in operation.

The pad is made with a piece of lint-free washed bleached muslin, folded once or twice, making a 10 or 12-in. square. Into the center of this folded muslin, cotton batting is bunched to make a ball about the size of a large egg, or larger if desired. The outer edges of the muslin are drawn up and around the cotton to form the pad.

The cotton in the pad is saturated with a 2-lb. cut white or orange shellac (depending upon the color desired). The pad is then tightened by holding the outer edges of the muslin in one hand and turning the ball tightly until some of the shellac comes through to the surface of the pad. The pad is then pounced in the palm of the free hand or on a clean piece of metal or board, to give uniform distribution.

With a swinging motion the pad is glided over the surface of the wood. A circle or figure-8 motion



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is always used during the application. At no time in the course of application should the operator stop with the pad resting on the surface of the wood. When fresh material is required for the pad, glide off the surface as in the starting motion. When the pad drags and becomes tacky, add two or three drops of raw linseed oil or a good lemon oil to the face of the pad with a finger-tip and wipe it in.

Fresh shellac is always added to the pad by opening the pad and saturating the cotton interior. By squeezing the pad during the application, fresh shellac keeps coming to the surface and will decrease the necessity of reloading the cotton in the pad.

A large table top, a set of six or eight chest drawers, or several pieces should be worked on at one time so as to allow the shellac to dry slightly. All the corners must be carefully coated at each stroke.

When the pores of the wood are closed and a smooth finish appears, alcohol is added to the face of the pad to remove the oil that sweats through. Care must be taken in the use of alcohol, as it may remove all of the shellac film (since it is a solvent for shellac.) A period of 24 hours is required for the shellac to set and harden. After this time the pores are again visible and the same procedure is repeated. Three applications are generally necessary to produce excellent results, although two or more are often used by experienced operators.

When not in service, the pad should be kept in a closed container for future use. A dash of alcohol will keep it in a soft moist state until it is again needed. The wood is never filled with paste wood filler nor stained with anything but an acid or water stain.

If any reader is interested in learning the trade names of some of the materials used in French polishing, by New York City finishers, I will be glad to give him the information. To give it here would be free advertising, so the Editor says.—WM. F. BEHLEN.

Final comments by G. D. Watt, Neal Storage Co., Cleveland, Ohio.

From one who has had extensive training and experience in French polishing, very little can be added to what has already been written on the subject for INDUSTRIAL FINISHING.

The utmost care must be given to the smoothness of the wood. All bare surfaces should be thoroughly sponged with water and, when dry, sanded with very fine sandpaper. All open-grained wood is filled and cleaned off; then allowed to dry; then sandpapered again, as this is the foundation of the job, and every care must be given to end grain so it will be filled smooth. . . .

Some may think it would be tedious rubbing and rubbing on one piece after another for days, but the real French polisher is turning out a work of art and beauty, and the result will be a finish which is as hard and smooth as glass. All this is done with a ball of cotton and absolutely no brush work at all. The grade of shellac must be the very best; otherwise you cannot get a hard finish.

From a commercial standpoint, French polishing is out of the question, and should be looked on as a hobby and also for touch-up and patch work in the finishing room.—GEO. D. WATT.

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By developing our finishes along with the development of Plywood Planes, we have gained an experience, an understanding that we never could have attained had we waited until now, when there is not sufficient time for adequate formulation and testing.

We have grown with Plywood. Our facilities are largely devoted to the production of Plywood Finishes. We are Plywood Finishing Specialists. If you are interested in Plywood Airplane Construction, you want to know us and we want to know you. Write today.

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Industrial Research Division of Wipe-On Corp., 105 Hudson St., New York

Malleable Iron Finish, Olive Drab

The J. E. Harris Co., Wooster, Ohio, announces that its No. 5155 Olive Drab Malleable Iron Finish has been developed as a substitute for cadmium plating on malleable iron. This finish dries to handle in 20 minutes and dries hard in four hours. It can be applied by dipping or spraying and dries to a gloss finish. The material has been approved for use on O. C. D. and Army fire-hose couplings, nozzles, spanner wrenches, etc.

Bomb Marking Machine

A new machine for marking all required data on the conical tail surface of bombs is announced by Jas. H. Matthews & Co., 3942 Forbes St., Pittsburgh, Penna. It completes the marking noiselessly.

Provisions are made for variations and irregularities in bomb surface to be marked, to assure complete and legible impressions. The machine is semi-automatic, made in various sizes for marking 100-lb. to 1000-lb. bombs. It is usually installed between sandblasting and the hydro-static tests.

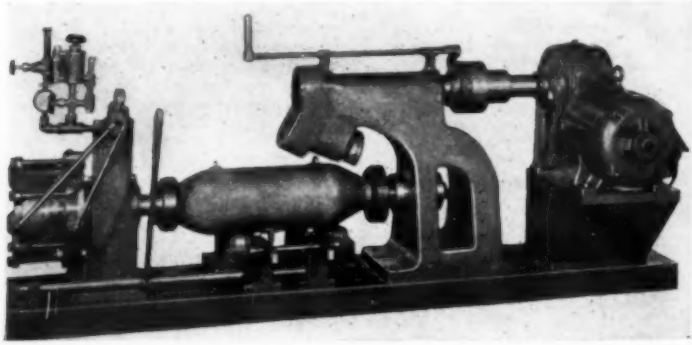
To operate this machine, the bomb is rolled into the machine in the position shown in the accompanying illustration, where it rests on the cradle roller. It is held in position by a pneumatic thrust chuck at the nose, and by a rotating thrust bearing at the tail. To mark bombs, a single revolution clutch is tripped by a hand lever. A roller die, with interchangeable type, rotates the bomb and progressively marks the required data, in one line of ¼-in. characters on the conical tail surface. The bomb is then raised from the cradle rollers and allowed to roll from the machine.

New . . .

MATERIALS
SUPPLIES
EQUIPMENT

Finishes for Army Bunk Beds

The Reliance Varnish Co., Louisville, Ky., announces development of new finishing materials (neutral gray primer-sealer, repair putty and olive drab



Compact machine developed especially to clearly mark shells on the production line.

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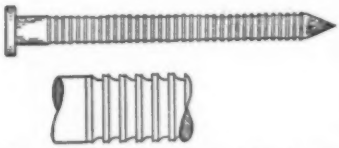
gloss enamel) which easily meet the specifications and withstand the tests set forth by the Quartermaster Corps for wooden bunk beds.

According to information supplied, these beds must be finished with a coat of neutral gray primer-sealer and a coat of olive drab gloss enamel. The resulting finish must withstand a 2% trisodium phosphate solution for 24 hours and must also resist an 8-day cycle of three hours in an oven at 125° F.; two hours at room temperature and 50% relative humidity; one hour in a refrigerator at zero; 18 hours in a humidity cabinet at 95° F. and a 9% relative humidity. In addition, they must resist an ultra-violet carbon arc-light fading test for 168 hours.

The repair putties include neutral gray glazing putty and olive green glazing putty, both of which dry quickly for recoating.

"The One-Way Nail" for Plywood

Since publication of the article entitled, "Plywood in Ship Construction" in July issue, pages 68 and 70, many inquiries have come in, espe-



Sharp ridges extending around its circumference anchor it firmly in the wood.

cially about those "nails which once driven cannot spring loose".

The Anchorfast nail is made of monel metal and is shaped as shown in the accompanying drawing. Stronghold nails are of the same design but are made of various metals. Tremendous quantities of these nails have been supplied for the construction of wooden naval vessels for both the Navy and Maritime Commission, and they are doing an excellent job.

These nails are available in a variety of different sizes. Free samples will be sent to those interested, by the manufacturer.—Independent Nail & Packing Co., Bridgewater, Mass.

Melts and Sprays Metal Alloys

A new, low-cost, self-contained and portable metal atomizer, capable of spraying any neutral alloy which has a melting temperature of up to 600° F. for protective coating, reproducing likeness, etc., is offered by Alloy-Sprayer Co., 2040 Book Bldg., Detroit, Mich.

The new sprayer is simple in design, thoroughly foolproof in operation, and requires only connecting-in with electric power and factory air pressure line for operation.

No special protection is required for the operator, other than that there be adequate ventilation and this is usually arranged so that the sprayed metal can be recovered for re-use.

The 12-cu.in. capacity model is equipped with electrical elements for heating the metal in a heavily insulated pot. Temperature control is variable to suit individual alloys over a range of 100° by means of a rheostat switch knob on the outside of the pot. A thermostat holds the metal at any pre-set temperature. Latch cover automatically seals the tops of the pot against air leakage during the spraying.

Heating the contents of the pot up to the melting point requires approximately 12 minutes after the cord has been plugged in at any convenient outlet. For production spraying, the gun can be kept filled from an auxiliary melting pot.

Actual spraying is accomplished by merely pressing the trigger on the handle of the gun, allowing the air to either draw, or force, the metal through the nozzle of the gun.

A Bull's-Eye Means Nothing Less Than All

The Bull's-Eye Minute-Man Flag which proudly rubs edges with Old Glory on the Berry Brothers' administration building, is more than a symbol of 100% participation in the United States Treasury Department's War Savings Bond Program.

It is the symbol, also, of the 84-year-old Berry Brothers' tradition of maximum effort in the striving for every worthwhile objective.

This effort-formula of *nothing less than all*, characterizes every Berry Brothers' paint-making activity . . . technical research . . . manufacturing . . . customer service.

It is the best assurance possible of dependable, trouble-free industrial finishes . . . both *now*, on war production, and *later*, on peacetime products.

The continuous nature of Berry Brothers' research guarantees the continuity of Berry Brothers' quality. This research is going on constantly, so that when the war is over we will be ready with the industrial finishes needed then.

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Quality Finishes Since 1858

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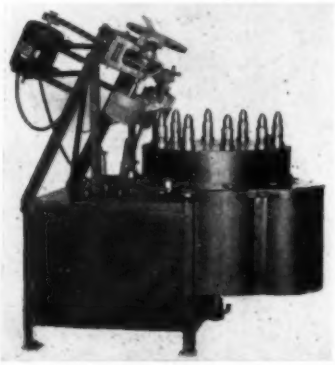
Polishing 37mm Shot Tips

Another important addition to those machines and devices which add to our growing facilities to win the war is announced by Leiman Bros., 137 Christie St., Newark, N. J.

37-mm. shot tips must be prepared for tinning and this machine is so arranged that a number of rotating chucks, mounted on a rotating wheel, hold the parts to be polished. The chucks are loaded at a point where



Polishes 1000 shot tips (37-mm.) per hour.

they automatically stop rotating. The rotating wheel indexes intermittently, bringing the work against the running abrasive belt where it pauses for a short period while it becomes polished. The abrasive belt, driven by a separate motor, has a range of three speeds.

Two small motors individually drive the chucks and the wheel. The driving mechanism is enclosed in the dust-tight base.

The abrasive belts are inexpensive and quickly replaced in a few seconds, so that aside from the single operator required to attend the machine, very little cost of operation is involved. This machine occupies a floor space of about 38x45-in. and is about 52-in. high.

Acid Proof Tank Has No Steel or Rubber

Among interesting substitutes being used by war-time industry is an acid-proof brick-lined wood pickling tank, in the development of which Sauereisen Cements Co., Sharpsburg, Penna., played an important role. Its war service consists in overcoming difficulties in obtaining steel tanks or rubber-lined tanks due to current shortages.

Work on early pickling tanks of this type, which could utilize the company's experimental advances in technical cements, was undertaken before America foresaw the present emergency. Mr. C. Fred Sauereisen, president, was a leader in introducing silicate of soda, quick-setting cements for this purpose. These cements had advantages of high temperature resistance, long-wearing qualities, and did not require special waterproofing treatment.

The first tank built, according to the company's specifications, was in Pittsburgh in 1936. Its structure may be described as follows: An existing wood tank was first lined with a cold acid-proof plastic about ¾-in. thick for expansion and double-sealing. This plastic lining and the exterior wood were both lined with protective hard-burned brick laid in modern silicate acid-proof cements.

The ruggedness of this tank under use and its complete effectiveness in preventing the escape of acids endowed it with many of the attributes of the steel tank. More were built; and they have proved to be especially practical in resisting both muriatic acid solutions used in galvanizing departments, and in resisting sulphuric acid solutions.

Explosion-Proof Timers

To meet the many present day demands for Explosion Proof Timers suitable for operations in atmospheres containing gasoline, naphtha, petroleum, benzol, acetone, lacquer solvent, natural gas, etc., The R. W. Cramer Co., Inc., Centerbrook, Conn., has just placed on the market a line of timers to meet such specifications.

Now we're ready with the answers
to your conversion problems

The substitution of Black Plate for Tin or Terne Plate, along with a shortage of certain critical materials used in the manufacture of finishing coats, was a foregone conclusion long before Pearl Harbor. We anticipated this situation and put our laboratories to work. The result is a complete line of finishes which, although using no critical materials, meet the problems of practically every type of surface and condition of application.

Answer No. 6---For Electrolytic Tin Plate

The new electrolytic process of tin plating has created an entirely new set of troubles for decorators. Although using only a fraction of the tin required by the hot-dip method, electroplating results in a plating so smooth that ordinary coatings will not adhere. We have licked this trouble with a new series of finishes specifically formulated for the decoration of electrolytic tin coating.

Write today for complete
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Spray Masks for Relief Designs

I am interested in obtaining some information regarding a practical method of masking out the relief designs on composition wall placques. I have made papier mache masks but find their use is limited insofar as cleaning them is concerned. I would like to have a putty or plastic that I can pour into the mold and then take it out before it hardens so I can cut my stencil as desired.—W. R.

Perhaps there are materials you can purchase or prepare and use as you suggest but, at the moment, we do not happen to know the names and addresses of such manufacturers. However, there is a company that makes special spraying masks of this type—the Conforming Matrix Corp., Toledo, Ohio. We suggest you communicate with this concern.—ED.

"Permanent Black" as Bottle Cap Finish?

Referring to the article, "Chemical Process Gives Steel Products A Permanent Black Finish," by Francis A. Westbrook, in your October issue, we are wondering if this process could be used in the refinishing of bottle caps. On page 15, you state that tank No. 1 contains a hot alkali solution, and tank No. 2 contains a hot rinse. We use these two tanks in the stripping and removing of the cork in crowns. It would be a simple matter to add tank No. 3 for the chemical salt solution, which blackens the surface.

Questions that come to our mind are: What are these chemical salts that would blacken the crowns, and can any other finish but black be obtained by using any other chemicals? How would this finish be accepted by the health department, as an enclosure for food products? Of course, the cork disc is put in between the crown and the contents. What would you say concerning the durability of the finish, because of the agitation in the crowner?—X. BREWERY CO.

A company manufacturing "Permanent Black Finish" informs us that it has made several of these installations for finishing bottle caps and that they are satisfactory. Among the customers named are Nehi Corp., Royal Crown Bottling Co., Crown Cork & Seal Co., etc.

Quoting from the company's letter: "We have also made shipments to two or three breweries and while the process is still rather young, we have made tests sufficient to know that our process will do the job satisfactorily on crowns. We are sending you, under separate cover, a few reclaimed crowns

Questions; Answers

Questions are welcome and will be answered promptly by mail. Readers are invited to prepare and send in additional information relating to any of these questions and answers.

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Boston, Mass. **Chicago, Ill.**

which have been cleaned and processed but not straightened. If you put these under your die, you will find that it will not affect the finish. The steel may be formed and twisted without breaking the surface."—ED.

Recoating Used Bottle Caps

We would like some advice as to the best method of recoating used bottle caps. These caps are stripped of the lithographing with a strong caustic solution, and in case of black iron plate, it is necessary that they be re-lacquered or repainted.

We have been spray-lacquering them, but believe it is not the best way of doing this. Please advise us whether individual dipping or tumble-lacquering would be more economical.

Also, advise us the procedure to use in either case, and the company from which we can obtain the best grade of paint or lacquer.—B.X.Co.

We suggest the use of a "whirl enameler" coating machine* such as that advertised from time to time in this magazine.

If you are unable to obtain one of these machines, we suggest the use of a tumbling barrel. Tumbling barrels can probably be secured from companies whose names we are sending you by letter. If not, a local mechanic can make one which will probably serve your purpose.

Several concerns manufacture paints, enamels, etc., that would be suitable for use when recoating your bottle caps. Write almost any company whose advertisement you see in this magazine. Off hand, we are suggesting, in our letter, the names of a few companies that are located in your territory.—ED.

*A combination dipping-whirling machine for completely coating large quantities of small parts with lacquer, enamel, paint or any other liquid finishing material.

We make a machine that does solve your problem but are unable to build them unless a priority order with rating A-1-A or higher can be furnished us. In a letter we are enclosing a folder showing and describing our "Speedip" Enameler.

Hundreds of makers of small parts have reduced their finishing costs 60% to 80% by the use of this enameler. Makers of war goods, cartridge and machine-gun clips, buckles and hundreds of other small parts, with contracts requiring production of 5000 to 10,000 per hour, are coating them in our No. R-200 machine. . . . Delivery about nine weeks after receipt of order and priority with rating.—RONCI MACHINE CO.

Letter to Industrial Finishing

We have your letter enclosing copy of a letter from B. X. Co., asking for "advice about the best method of recoating bottle caps." We are receiving similar requests by the score from breweries and bottlers of all kinds of beverages and from several makers of bottle caps. We advise them all that priorities rating A-1-A or higher are required to enable us to get aluminum, steel, motors, hydraulic pumps, etc. A few say they can furnish priorities but none so far has reached us—but as the use of nickel or cadmium, which was used to plate new caps, has been forbidden and as the cost of spray-

Transport Protection

Lowe Brothers wartime finishes play an important part in protecting war weapons and materiel against the hazards of exposure, temperature and transportation during their rigorous journey from production lines to supply depots and combat areas.

There's a sound basis for Lowe Brothers ability to supply you with a vast amount of current information regarding application data, thinning ratios, drying schedules, etc., on Government finishes as adopted by all branches of our Armed Forces. Here are 3 excellent reasons why—

1. We are supplying U. S. Government specification finishes to makers of a wide variety of war weapons and materiel.

2. Our research and field technicians have been continuously cooperating in the development of finishes for modern sinews of war.

3. We've had years of experience in developing special formulations for a great variety of well-known industrial products.

The point is we know industrial finishing problems and we know Government Specification Finishes. Furthermore, we know that your inquiries for bids or other data must have prompt attention. And you'll get it from

Industrial Sales
THE LOWE BROS. CO.
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Lowe Brothers
WARTIME FINISHES *for Industry*

IN ACCORDANCE WITH U.S. GOVERNMENT SPECIFICATIONS
AND MAINTENANCE PAINTS
TO MULTIPLY YOUR MAN POWER EFFICIENCY

ing enamel is so great by comparison with the cost of coating in centrifugal machines, Washington may issue priorities, especially since the War and Navy Depts. are large purchasers of beer and other beverages for the armed forces.

Various arsenals are coating small parts in "Speedip" enamelers, some owning four or more machines, and some contracts for war material are placed with the understanding that coating will be done in these enamelers.—RONCI MACHINE CO.

Finishing Bottle Caps?

We have a customer who is interested in finishing small objects about the size of a 25-cent piece. We believe that tumbling would be the best method to use in this instance. Since we are not as familiar as we should be with all phases of the tumbling operation, we would greatly appreciate any information you could offer in this regard. Further, we would like to have—if you have same available—the names of manufacturers of tumbling equipment, especially those in the Milwaukee area. If you can furnish any of the above information, we would be grateful if you would send same to us.—C. L. CO. (Finish Mfr.).

We are sending you a reprint of R. J. Fairburn's article on tumble finishing, which appeared in two installments, in Sept. and Oct. 1941 issues of this publication. Also, in a letter, we are listing the names and addresses of manufacturers of tumbling barrels. If priorities prevent you from getting a tumbling barrel made of metal, you can probably get what material is needed to make a wooden tumbling barrel.

Probably a better machine for your work would be the whirl enameler, but you must have a high priority to get one of these.—ED.

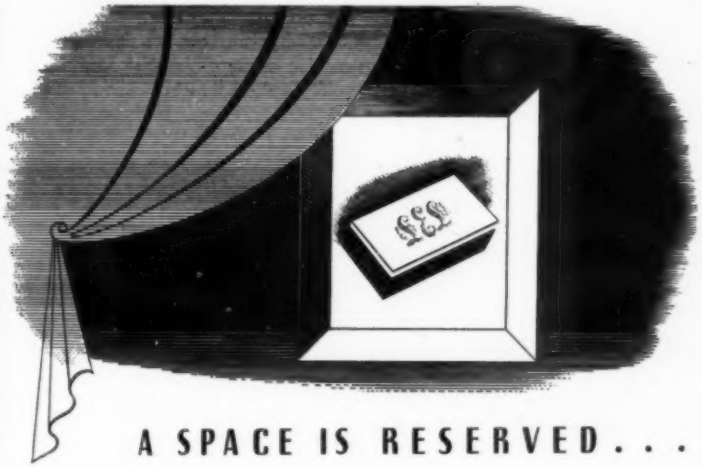
Black Streaks in Maple

What can I do about black mineral streaks in maple wood? Can these streaks be finished so that they are not noticeable after the piece of furniture is finished? To paint them out, what colors should be used? The color of the finish is to be a reddish-brown maple.—G. D. G.

We are advised by expert finishers that the only way to take care of these streaks is to paint them up with a fine touch-up spray, using a color that will closely match your final finish. If you are not in position to match the color with what materials you have available, we suggest that you send samples of your finished pieces in the reddish-brown maple to your supplier of materials and have the company prepare a pigmented color to match. Advise your supplier that you want to use this material to paint out black streaks.—ED.

Who Can Furnish An Odorless Lacquer?

We have a problem which you might be able to answer for us. Due to the metal restrictions, we are manufacturing a wood and hardboard (United States Gypsum



A SPACE IS RESERVED . . .

There is always a spot for a better product. There is always room at the top. The trick is to hold it.

Public favor is never permanent . . . it must be renewed continually. Not an aimless, hit-or-miss search for change . . . but a careful, well-directed effort along certain, productive lines by qualified and expert engineers.

For example: finishing. Probably no one point is more important . . . more open to improvement. It is our business to improve finishes . . . to reduce finishing time and costs . . . and, by these means to increase sales.

Your inquiry incurs no obligation. Address Dept. K.

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A SUBSIDIARY OF THE STANLEY WORKS, NEW BRITAIN, CONN

Co. board) bread box. We have tried a lacquer finish on the box, but one of our important customers tells us that the odor is objectionable, and therefore this concern will not purchase the box.

We know that if we could do away with the lumber in the construction, we could bake the hardboard at a high temperature, and thus help to solve this problem quickly. But you can't join hardboard to hardboard; you must have wood with which to join up the hardboard material.

All in all, our facilities for baking are not very good. We would prefer to use an odorless lacquer on this hardboard and wood bread box construction. We can open the lid of the box after the product is painted and let the box dry in an open room for as many hours as may be necessary. But a 36-hour drying time still resulted in objectionable odors from the interior of the box.

Can you help us on this important problem?—E. N. C.

In our reply to this question we have given the company names and addresses of a few concerns whom we believe can furnish what they need. However, we will appreciate further information on this from advertisers and readers.—ED.

Wood Finishing in Australia

May, 1942, number of INDUSTRIAL FINISHING interests us very much, especially the wood finishing article by W. F. Dentzer, page 29. Would you kindly contact him?

Regarding the curtailment of lacquers, we would like to know something more about the new type of "high gloss down to dead flat" varnish, which is as clear as glass. We need a varnish to replace lacquers. If Mr. W. F. Dentzer could let us have a veneer sample of gloss and flat over water stain, as mentioned in his article, with prices for same and full instructions to get best results, and if varnish sealer is needed, etc., we would like to get it. We have spraying equipment for air-drying only. What thinners are used to reduce this varnish?—E. E. PRIEST, (Builder & Decorator), Melbourne, Victoria, Australia.

Under separate cover, at the earliest possible date, I will mail you sample panels of walnut, mahogany and oak, if possible, finished according to my article in INDUSTRIAL FINISHING.

The first application to the panel will be a water stain made up as follows:

To one gallon of boiling water, add the desired amount of water-soluble stain powder for any given color. While this water is still hot, add 3-oz. of bicarbonate of soda to the gallon. Then stir in eight fluid ounces of 4-lb.-cut white shellac. You will find this shellac will dissolve readily in this solution.

This stain should be sprayed. If spray equipment is not available, you may brush an even coat on the wood.

If the wood is open grain, such as walnut or mahogany, after the stain has dried for three hours and is well sanded with No. 5/0 sandpaper, you will then be ready to fill with any good grade of paste wood filler, allowing the filler to dry overnight.

The surface is now ready for an even coat of varnish sealer, which

SEND FOR YOUR COPY OF U. S. GOVERNMENT SPECIFICATION FINISHES

TO aid the finishing departments of plants engaged in war production, we have prepared a booklet which provides manufacturers of armaments with essential information on M & W finishes that have been made to conform with government specifications. It describes various M & W finishes according to color, sheen, thinning, drying properties, consistency, resistance to heat, water, acids—and other prescribed characteristics.

Where changes in specifications are called for, our laboratory and engineering staff are at your disposal.

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should be sprayed or brushed, allowing overnight to dry. Sand the surface with No. 5/0 or No. 6/0 sandpaper.

Now you are ready for a sprayed coat of synthetic waterproof flat varnish. The synthetic flat varnish I have in mind is clear, waterproof and, I might add, practically mar proof. The flow of this varnish is perfect, so there will be no trace of orange peel. Time required for drying is overnight.

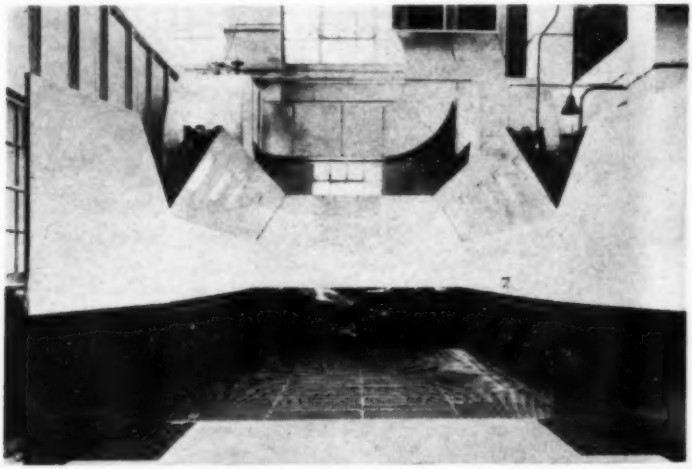
The result of the operations just described will be a smooth finish. If a rubbed effect is desired, the finish may be rubbed with pumice stone and water or pumice and oil. This will give you a rather dull-rubbed effect. Should you desire a high polish you may follow this operation by rubbing with rotten-stone ond oil. The result will be an extremely high polish.

After receiving the panels, if you are still sufficiently interested, I am sure that my company will be more than pleased to send you samples for your own tests.—W. F. DENTZER.

New Synthetic Replaces Rubber in Raincoats

A new synthetic which is replacing rubber in army raincoats and which, it is expected, will soon replace rubber also in many other products using waterproofed fabric, has been announced by the Stanley Chemical Co. of East Berlin, Conn.

The new synthetic is formulated from safety glass plastic and named "Haydenite" for Stanley's Technical Director, E. M. Hayden. Better than rubber, cheaper than previous waterproof coating, easier to apply than other synthetics, Haydenite sounded the death knell of rubber for army raincoat use—and for all requirements involving the use of waterproof fabrics.



Several special lighting and ventilating features will be recognized in this large down-draft water-wash spray booth, now in operation in a U. S. arsenal, where tanks and heavy war equipment are being painted. Photograph, courtesy of the Binks Mfg. Co.

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Enameled Wire

UNIFORMITY of enamel insulation on copper wire is obtained by having a constant speed of the wire as the coat is applied and baked. The Westinghouse East Pittsburgh works maintains a quality product by supplying constant voltage power from a central motor-generator set. The oven on this tower has a range of temperatures suitable to bake insulation on sizes 26 to 32 B & S. The "Quick Jerk Test" and the "Solvent and Varnish Resistance Tests" are used to check the degree of bake.

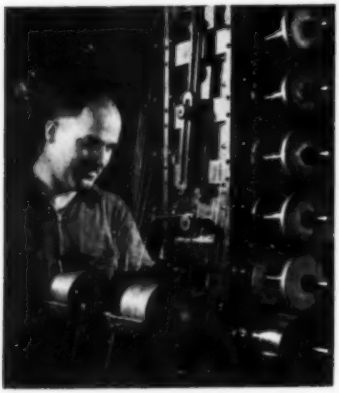

Fig. 2—Inspection of the coated wire is made near the multiple traverse mechanism which winds the finished product on spools ready for shipment. Suitable tension is maintained on each spool individually by use of a clutch overdrive on each spindle.

Tuf-On Finish Bulletin

A bulletin listing and briefly describing several special coating materials for plywood and metal surfaces of aircraft has been issued by The Industrial Research Division, Wipe-On Corp., 105 Hudson St., New York, N. Y. Copies of the bulletin are free.

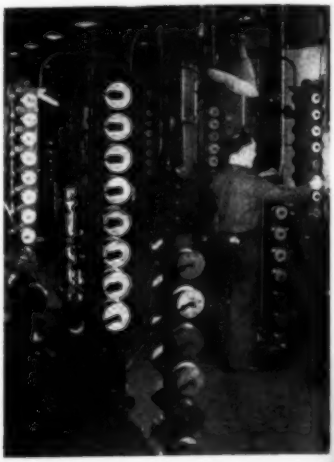

Fig. 1 — Fine threads of copper wire leave the lower tier of spools and run at a constant speed across pulleys and driving capstans to the sheaves. These are partly immersed in the liquid enamel bath directly below the baking oven. A wire receives a coat of insulation each time it leaves the sheave and passes through the baking oven. After the final coat is baked, the wire with its tough but flexible coat of enamel is wound for shipment.

Safety Suit for Women in War Industry

A safety-styled costume to help women workers in the battle of production combat the "seventh column" —industrial accidents—includes slacks or overalls, a plain snug-fitting blouse with elbow-length or short sleeves, a turban or bandana, Oxford-type shoes with "Cuban" heel, gloves and goggles.

The anti-accident costume was worked out by Harold Tharp, director of safety for Willys-Overland Motors, Inc., Toledo, Ohio. Mr. Tharp says that its use on the jeep production lines has virtually eliminated mishaps and greatly increased the efficiency of women workers.

In urging a nation-wide adoption of the costume, Mr. Tharp cited recent figures compiled by the National Safety Council which show that unless the present trend in accidents is checked, 52,000 workers will be killed by the end of 1942 and another 4,168,000 will be injured.

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DESPATCH OVEN COMPANY

MINNEAPOLIS MINNESOTA

Imitation of Rosewood on Willow

I HAVE worked out a method of imitating rosewood on willow which I believe will be of interest to other finishers.

First, stain the wood with a good uniforming stain made for willow in the rosewood shade and let the treated surfaces dry overnight. Apply one thin coat of lacquer sanding sealer. When the sealer is dry, sand it lightly, to a smooth surface, with No. 8/0 sandpaper. Dust off and proceed as follows:

Prepare a mixture of coach black and naphtha to a fairly thin consistency and add a very small amount of raw linseed oil. Then dip a 3-in. overgrainer brush into this mixture and draw it out over a board, table top or piece of glass, pulling toward the handle and away from the bristles in order to draw some of the surplus mixture out of the bristles. Otherwise too much material will be applied to the surface, and it will run and will not blend well.

After you have done this, then apply the brush to the surface, pulling lengthwise of the grain, thereby leaving the black lines as in rosewood. While the lines are still wet, blend with a badger blender, using the ends of the bristles only and soften the lines so they will not appear too abrupt or artificial—so they will look natural and appear to be a part of the wood. A little experimenting along these lines will be necessary, but some attractive effects can soon be accomplished.

If the mixture of coach black dries too slowly, add a little more naphtha; if it dries too fast, add a little more raw linseed oil until the mixture works satisfactorily.

I prefer to make my own overgrainer by taking a flat overgrainer brush and cutting out some of the bristles, leaving some of the bunches of bristles ¼-in. wide and some about ⅛-in. wide, thereby getting away from too much uniformity which is not characteristic of natural woods.

If a badger blender cannot be obtained, a split fitch brush can be substituted, if it is used lightly for blending.

After the lines have been put in satisfactorily, let the graining dry overnight and proceed from there on, the same as in any wood finishing job — sanding, sealing, dry four hours and sand with No. 8/0 sandpaper, and finish with lacquer or varnish.

Information about where to obtain materials for this work will be furnished on request, by the author.—F. HAGAN.

Oak Casket Finishes

SOME attractive and pleasing effects can be produced on oak by the following procedure:

First, putty all nail holes, etc., with a good water putty (not oil). Let dry about one hour and sand smooth with No. 5/0 sandpaper, using a felt or rubber sand block for holding the paper. Then take a wire brush and brush with the grain to open up the pores of the wood, being sure to brush all of

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the putty out of the pores around nail holes. If this is not done the finish will have large spots around the nail holes.

Brushing with a wire brush will tend to raise some of the grain, so it is necessary to lightly sand all of the surface with No. 5/0 sandpaper. Dust off the surface thoroughly with an air duster, being sure that all of the dust is out of the pores of the wood.

Then, for example, make the following mixture: To one quart of clear lacquer, ready to spray and not too heavy in body, add one ounce of gray lacquer enamel. Stir thoroughly and spray on the casket, using a suggested air pressure of approximately 55-lbs. Do not start in by applying too much lacquer at one time, but go over the surface lightly several times in order to give the wood a gray appearance, but at the same time letting a little of the color of the wood show through.

This will produce a more beautiful effect than if the wood were coated a solid gray. Let this coat dry for about one hour at a room temperature of around 70° F. When the coating is dry apply one wet coat of gloss top-coat lacquer, not too heavy in body, as we do not want to close up the pores of the wood. Let this coat dry for about four hours and sand lightly with No. 8/0 sandpaper. Then apply a coat of black wax, brushing it well into the pores of the wood. It is not advisable to apply wax over the entire surface of a casket at one time as it will set up too hard before the casket can be polished out. Apply it over just as much area as can be readily polished effectively at the time.

In this wax-polishing operation be careful to leave some of the polish in the pores of the wood because here is where you get your contrast—by making the pores of the wood a different color in contrast with the background. It is a good idea to first rub the wax crosswise of the grain and then polish out lengthwise.

A little experimenting with different shades of lacquer and contrasting colors of wax will produce some beautiful effects. The colors can be kept "soft" and in keeping with what will be suitable for caskets.—F. HAGAN.

Flame-Priming Steel for Paint

BEFORE protective coatings are applied to steel it is of utmost importance to prepare the surfaces by completely removing mill scale. This is usually accomplished by acid pickling or sandblasting.

A relatively new process for the preparation of steel surfaces for painting is flame-priming. This is a development of the oxy-acetylene industry. The tool used is a blowpipe equipped with a special head which provides closely spaced rows of oxy-acetylene flames—"the hottest flame known to man." When these flames are applied to the surface to be treated, adhering rust and scale expand and pop off, leaving the metal underneath relatively unaffected, and warm and dry to receive the prime coat of paint.

The ease and economy of applying flame-priming, and the resulting high quality of the treated surfaces, are such that the process is

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for paint, varnish, lacquer, baked enamel, adhesives

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SPECIALTY COATINGS—I. C. D. Labs. have specialized in the formulation and manufacture of non-inflammable coatings and substitute finishes. If you have a tough coating or finishing problem send in your specifications, finishing schedule and requirements. Immediate action and a prompt reply promised.

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being increasingly used on many types of work.

The oxy-acetylene flame-priming process is designed to improve the surface to be painted, as well as the conditions under which the paint is applied. The fact that over 20,000,000-sq.ft. of steel surfaces are flame-primed monthly is in itself indicative of its merits.

This procedure not only produces improved corrosion resistance but also increases cleaning and painting rates and reduces setting time for the paint. Moreover, paint can be applied under conditions of low temperature or dampness that would otherwise cause major delays. In addition to removing loose scale and rust, the process drives moisture from the surface, leaving the surface warm and dry for the application of paint. This pre-heating not only prevents recondensation, but markedly improves the quality of the priming coat.

Studies of the action of paint on warm surfaces indicate that the heat, in effect, thins the paint and lowers its surface tension. This imparts a desirable wetting action, causing the vehicle and pigment to penetrate into cracks, crevices, and pitted sections and carrying the inhibitors into contact with the base metal. As a result, a mechanical bond is achieved as well as a technically adhesive one. The improved flowing qualities of paint on warm surfaces result in easier application and a smoother finish. An accompanying advantage is that the paint sets up more quickly, and from the metal out. This eliminates the tendency of a skin to form and blister, as often happens when the surface is painted in the sun.—BAKELITE REVIEW.

Use a Tack Rag

SOME fellows make a tack rag by simply taking a piece of cheesecloth or similar material, soaking it in varnish, and then wringing it as dry as they can. Such a tack rag is better than none, but it cannot compare with commercial tack rags that have been more scientifically prepared. One that recently came to my attention has an adjustability feature about its degree of tackiness. Heating it slightly makes it more tacky. Hanging it in the open air to make it less so. These tack rags are especially effective for preparing metal aircraft skins for synthetic enamel. They completely remove all metal dust and other foreign matter resulting from drilling, riveting and other pre-finishing operations. According to reports, this rag is proof against spontaneous combustion or ignition.—L. BENNETT.

A Different Filter

ARE YOU one of those who have not yet found a type of compressed air filter that seems fully efficient? It may be that you would have better success if you used a filter in which the centrifugal principle for separating oil, dirt and water from the air is employed in connection with a good filtering medium. When the separator includes both, there is still smaller chance that anything will get past it to be fed onto your work with the finishing material. One such, that is very efficient, also has an automatic trap that eliminates the necessity for attention, and assures continuous and efficient filter operation.—J. MOORE.

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Lengths 4 ft., 6 ft., 8 ft.

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Heat-Repellant Low-Visibility Paints

Paints that deflect the sun's infra-red heat (similar to aluminum and white paints) but which have low-visibility (making them suitable for camouflage) are announced by Lasting Products Co., 200 S. Franklintown Rd., Baltimore, Md.

In a 4-page illustrated bulletin, the company calls attention to the fact that dark surfaces absorb the sun's heat and increase interior temperatures. However, white or light surfaces have high visibility from the air, making storage tanks and buildings vulnerable bombing targets. It is imperative that all important objectives should be low in visibility. There is no paint made that will completely obliterate tanks or buildings—but properly shaded paints will cause them to blend with the surrounding terrain, rendering them unrecognizable to enemy bombardiers flying at high altitudes.

Fluorescent Fixture Catalog

A new fluorescent lighting fixture catalog is being offered by Sylvania Electric Products, Inc., (formerly Hygrade Sylvania Corporation), Ipswich, Mass. This catalog is designed to simplify the prospect's problems of selecting the proper types and quantities of fixtures for his particular lighting project. Besides illustrating over 30 models, complete with technical specifications, this book contains a list of Recommended Minimum Standards of Illumination, information on how to plan a fluorescent installation, pictures of actual applications, and general engineering and maintenance information.

National Paint Dictionary

(Second Edition)

The second edition of The National Paint Dictionary by Jeffrey R. Stewart, has been published by the Stewart Research Laboratory, 1340 New York Ave., N. W., Washington, D. C. This book is more than a dictionary; it is really a one-volume encyclopedia of illustrated information conveniently arranged alphabetically and attractively presented in 224 pages 9x12-in. It contains approximately 200 illustrations and charts; includes definitions of trade names and raw materials used in the paint and allied industries; has charts, tables, useful information and miscellaneous data; describes all of the important testing devices and apparatus used in the laboratory; is strictly technical, thoroughly authentic and completely unbiased.

The author, Jeffrey R. Stewart, F. A. I. C., is editor and publisher of the National Paint Bulletin. He was formerly associated as research chemist with Dr. Henry A. Gardner of the National Paint, Varnish & Lacquer Association.

The heavy green covers are attractively embossed and have raised gold letters on a panel of red. The price of this elaborate volume, which looks like $15.00, is only $7.50. Copies can be ordered through INDUSTRIAL FINISHING Magazine.

New Books

CATALOGS
CIRCULARS
NEWS RELEASES

Infra-Red Paint Baking Brochure

A 32-page brochure containing over 100 illustrations of infra-red drying equipment, with a complete description of each, has been published by The Fostoria Pressed Steel Corp., Fostoria, Ohio. This brochure will suggests to every industrial executive, uses for the process where paint baking, drying, dehydrating and preheating are involved.

The opening pages describe what the process is and how it operates; next follows the many installation pictures and case histories. The inside back cover shows user satisfaction through testimonial letters of several well-known American manufacturers.

Nylon Paint Brush Bristles

A 5-page News Release from the Public Relations Division of E. I. duPont de Nemours & Co., Wilmington, Dela., announces the successful development of nylon tapered paint-brush bristles. According to this article, 4,000,000 to 5,000,000-lbs. of bristle are required by this country's

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Naval photos, courtesy U. S. Army and U. S. Navy

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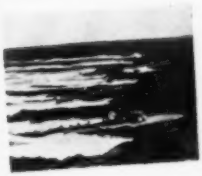

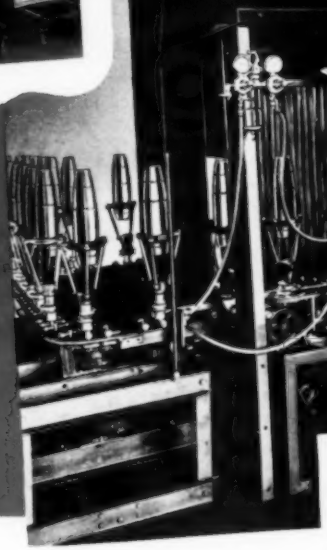

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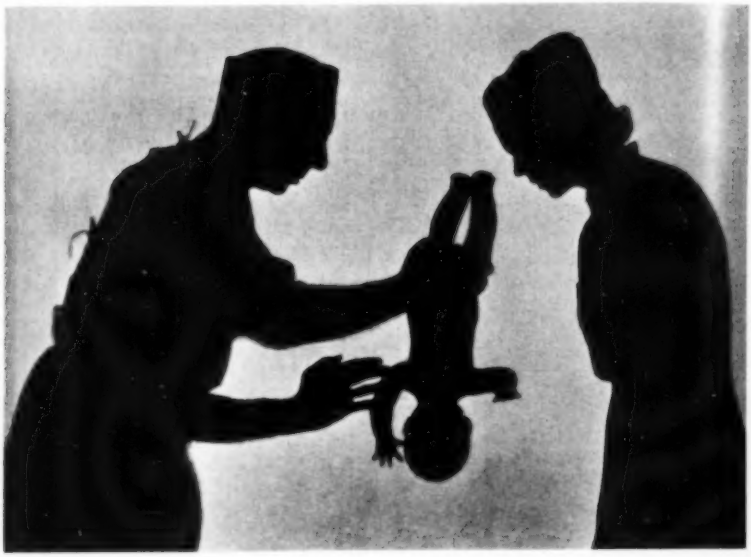

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brush manufacturers in a normal year. More than half go into paint brushes; the remainder into toilet, industrial and miscellaneous brushes.

Formerly, most of the bristles used were imported from the Orient.

Nylon paint brush bristles, announced in this report for the first time, not only have the required taper but also resiliency, toughness, length, and inertness to paint ingredients. Moreover, they wear at least three times longer than natural bristles. The achievement of this tapered synthetic bristle culminates five years of intensive research in Du Pont laboratories.

Metal Cleaning and Surface Conditioning

A new 4-page folder contains information and illustrations about a new science of metal surface conditioning and a new type of field engineering that are clearing war production bottlenecks. It is published by Solventol Chemical Products, Inc., 15841 Second Blvd., Detroit, Mich. Features include the following:

1) Preventing rust and corrosion.
2) Removing smut, abrasives and lead.
3) Increasing salt spray test on paint.
4) Protecting parts against finger marks.
5) Cleaning all alloy parts safely.
6) Eliminating oil slushing.
7) Reducing washing to one stage.
8) Streamlining washers and layouts.

Copies of this folder are free.

Tinting Color Chart

A tinting color chart that lists various colors and the tinting colors needed to mix with them for matching practically any specified new or aged color, has been prepared for free distribution by E. I. duPont de Nemours & Co., Inc., Wilmington, Dela. The folder consists of 12 pages 8½x11-in. The contents are arranged in convenient form for quick reference.

Research Report on Finishes for Aircraft Plywood

New finishing systems for aircraft plywood are currently giving aircraft manufacturers new production problems. One of the major problems is that of effective finishes. Finishing systems must have minimum weight, production speed in application, resistance to the invasion of moisture, protection against extreme changes in temperature, and durability against the ravages of vibration.

The problems of aircraft plywood finishing are so new that no one manufacturer has had sufficient experience to know all the answers. Ault & Wiborg Corp., a subsidiary of Interchemical Corp., has just completed a report on an extensive research into plywood finishing. The technical information in this report will be of interest to aircraft manufacturers who are turning to plywood.

Ault & Wiborg Corp.'s engineering staff has devoted a major part of its research program to the problems of aircraft plywood and its finishing requirements. Complete finishing systems have been developed and finished plywood has undergone severe tests, some of them for a period of several years. The systems are adapted to specific requirements differing for each of the woods used—birch, mahogany, fir, poplar, spruce. The development of both materials and finishing systems has been conducted in close cooperation with some of the leading aircraft manufacturers and the presently known requirements and specifications have been met.

Copies of the Ault & Wiborg report have been placed in the hands of the personnel of the aeronautical division of Ault & Wiborg Corp. The data contained in the report is of such a nature that it is not permissible under wartime conditions to offer it for wide distribution. However, it is available to aircraft manufacturers or prime contractors who are directly involved in the production of plywood aircraft. Write to Mr. Wm. H. Dernell, Aeronautical Division, 75 Varick St., New York, N. Y.

Metal Parts Washers

A new 24-page book filled with information and illustrations in reference to metal cleaning compounds and metal cleaning machines has been prepared for free distribution by the Detroit Rex Products Co., 13005 Hillview Ave., Detroit, Mich. The book is bound between heavy orange-colored paper covers, decorated with blue and lettered in black.

The various types of Detrex Washers manufactured for use with alkali cleaning compounds, petroleum spirits and emulsion cleaners, together with the many features of design and construction incorporated in these machines, are pictured and described in detail. Special adaptions of this machinery for defense armament production, particularly in the aircraft

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LIEUT.-COLONEL BOYD (BUZZ) WAGNER, D. F. C., U. S. Army Air Corps, first met Jap Zero fighters and bombers in the Philippines. He has been in continuous action since then and correspondents have reported his most recent score as forty-one Jap planes. He has received the Distinguished Flying Cross and the Purple Heart for his great courage, ability and remarkable record.

All of us on the production front must go all out to give our fighting men enough of the best equipment when and where they need it.

Our production facilities are devoted to the manufacture of government specification protective coatings. Listed here are just a few of the war products now being coated with our materials.

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industry, are included. Four pages of the book are devoted to blueprint type of assembly drawing covering in some detail the construction of washers using both belt and monorail conveyors.

Triad alkali cleaning and stripping compounds, supplied by this company for cleaning metal parts, and used in conjunction with the equipment described above, are included. Detrex equipment built for degreasing, shot testing and other processing is also covered.

Surface Smoothing and Preparation

Anyone responsible for the production of metal or plastic parts of small size will find of extreme interest the new 24-page booklet "Wet-Dry Belt Surfacing" just issued by the Porter-Cable Machine Co., Syracuse, N. Y.

This booklet reveals a "new way of doing things to get quick results" and explains the factors that make this possible. It points out the departments in which belt surfacing saves time, money and manpower in the relief, release and supplement of heavy machine tools, and details with description and illustrations, many parts on which operations are done freehand or with simple, inexpensive fixtures.

Ultra-Violet Light and Its Applications

A new book under the above title represents a culmination of a series of studies in the fields of ultra-violet light and luminescence. The authors are H. C. Dake and Jack DeMent, Editor, and Associate Editor respectively of The Mineralogist Magazine. The book contains more than 200 pages 5½x8½-in., has a few illustrations and is bound in green cloth covers lettered in gold. It is published by the Chemical Publishing Co., Inc., Brooklyn, N. Y., and sells for $3.25.

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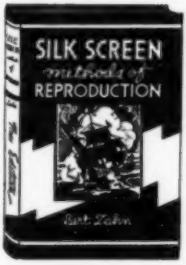

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Editorial

Painting Bombers

A few interesting highlights on Painting Bombers is included in the following letter from the painting department foreman, who was formerly foreman finisher in a factory making civilian goods:

"I am back in the cornbread and you-all country now. Left the coast two months ago and came here to work for ——— (a better job.) I like it much better here, probably because I have a crew of good looking girls, but may change my mind when the first blizzard arrives.

"We have found in the last year that women are able to do a large majority of the work in aircraft finishing. There is a great deal of masking and stenciling to do and they are naturally adept at this. Also, with their small hands and slight stature, they can get into places where a man cannot. We have a magnificent set-up here which is the finest I have ever seen. It is the latest thing in safety and efficiency and is fully equipped for peak porduction.

"I have been working in all the parts of these big bombers, here and at ———, and also in many of the different departments, so when the war ends I think I will be able to build a ship myself, without blueprints. Seriously, one has no idea of the work and engineering that goes into a modern fighting plane until he sees the inside of one.

"Have seen somewhat of a change in aircraft painting since I got into it. We now have one-coat flat synthetics that dry in ten minutes, which is quite an achievement for duraluminum finishing. However, this is partly offset by the increased use of magnesium castings which require more than ordinary care in finishing. Then too, there is more and more pressure put upon the paint department for shortening the time for final finish, because a plane is ready to fly when it gets into our paint hanger, and the Army wants to get it into service immediately.

"Since the labor shortage there

has been increased interest by the management of defense plants toward the health and safety of employes. For instance, free typhoid shots, periodic X-rays for spray operators, and cleaner finishing rooms. Respirators and hand protection creams are also furnished without cost."

Salvage All Scrap

A salvage program in a plant, factory, shop or yard, must be based on the fact that industrial salvage and conservation form the backbone of the War Production Board's campaign to put the nation's waste back into production. Unless American industries take on the major job of making broken down, dismantled or unusable materials available for scrap, the national supply of steel for manufacture of war equipment will be endangered. For, if steel mills are not assured of an adequate supply of scrap, they cannot continue to keep up production of the steel which goes into planes, tanks, guns and ships we need to win the war.

Such factors as type of work and the size of plant, partially govern the organization of a company's salvage operations. But common methods of organization of a scrap campaign, collection, segregation and disposal, are available to all.

The organization to operate an effective salvage collection should be headed by an able executive of the company, as salvage manager. He should work with superintendents and foremen in various departments. He must be armed with ample authority to make decisions to scrap unused material.

It is the management's function to mark and send to the scrap heap equipment that is obsolete. After inspection, use this yardstick in coming to a decision: If a machine or other piece of equipment hasn't been used for three months, and if it can't be proved that it will be used in the next three, turn it over where it can be used, or scrap it. Either dispose of equipment in industry if there is a call for it, or put it to work as scrap for the weapons of war.

Once such equipment has been marked for scrap, a responsible shop man should supervise its dismantling and classification. The assortment may be made to yield valuable replacement parts for machines now in operation. Cutting down the need for purchasing new parts will remove the plant from the competition for equipment.

Protecting Finished and Semi-Finished Products

In some large establishments manufacturing a considerable variety of the finer type of war products, it is usually necessary to place in temporary storage certain quantities of semi-finished and completely finished parts. Frequently these items have been cleaned and coated or plated and stored under conditions that are not exactly ideal. For example, to mention only a few factors that may hinder perfect workmanship: Larger crews of workers inexperienced in the exact technique of this particular work; the use of more or less new or unfamiliar materials, equipment and methods; supervision pressed with too many problems at a time; hurried handling and storage of parts in rooms

affected by dampness and inadequate ventilation.

Results observed: Discoloration, corrosion and rusting of certain metal parts; discoloration of certain protective coatings; the flattening of some wrinkle-finished surfaces. Naturally, this means a considerable loss—and it is a preventable loss.

In the first place, surfaces to be coated—whether with paint or plating—must be chemically clean. This means, among other things, no traces of acid, alkali, soapy cleaner, wax, oil or finger marks—not even in the surface pores of the metal.

In the second place, an adequate protective coating must be uniformly applied over all of the surface. This coating may be a permanent finish or a temporary coating. Several kinds of both are available. Some coatings are not really protective, especially when conditions of storage or service are something less than ideal. And we must not overlook the fact that high-quality protective coatings can fail if they are not properly prepared and correctly applied to chemically cleaned dry surfaces at reasonable temperature. For instance, the use of incorrect thinners or solvents mixed with the material, wrong viscosity, non-agitation of pigmented material, oil or moisture in compressed air used for spraying, excessive evaporation of solvents from dip tanks, application of coatings too thin, inadequate drying after coating. These are only a few of the possible causes of failure in a high-quality coating. And, of course, the human element is in the picture all along the line.

At the point of temporary storage, workers are obliged to do more or less handling and stacking which may bruise or damage small areas of the coated surfaces. This usually leaves these places unprotected. Some items may be sufficiently valuable to deserve an additional temporary coating, of which there are several, or a wrapping of wax paper.

The Editor will welcome letters from readers giving their experiences on this important subject. Publication of an exchange of ideas, experiences and suggested remedies will be beneficial to all concerned. It should contribute substantial aid toward stopping preventable losses and wastage in our war production activities.

How to Train Workers

★ Foremen must instruct their workers carefully and have more patience now than ever before. The hiring of so much green help, as is necessary today, is calling for a more complete plan of instruction by the foremen. Schedules must be met on time in order to avoid retarding our war effort. Production must move forward rapidly and accurately. Operations must be "broken down" and taught to new help, one operation at a time. One operation can be taught to operators in a comparatively short time, but it takes too long to try to teach them three or four operations, and it slows down production too much.

★ Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

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The Government has a plan known as the "Training Within Industry" program which is being put on in Defense plants all over the country. Every foreman having the opportunity to get this training should do so, as it will be of great help to him in training his new employes. This course takes 10 hours actual time.

First of all, the foreman is given a card to carry at all times. On this card are printed the main factors of the training. After the training has been given, the card is carried for reference. Each foreman completing the course is given a diploma showing that he has completed the course and is qualified as a job instructor.

The course teaches a foreman how to get ready to instruct, how to have a plan of work, how to break down the jobs, how to have everything ready and have the work places properly arranged. It also teaches how to instruct, such as preparing the worker, putting him at ease, getting him interested in his job, showing him by illustrating, talking clearly and distinctly (and do not talk shop terms that he does not understand) and many more things that we foremen are sometimes careless about.

The beginner is nearly always nervous and excited, so the foreman must be patient and sympathetic. The slogan is something of importance and goes as follows:

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"If the worker hasn't learned, the instructor hasn't taught."

This can be illustrated by a true story of a beginner in a factory that I am well acquainted with. A young fellow about 20 years old had been hired as a trucker in this plant. He was assigned to trucking gears. It was the first job he had ever had any where. One day he was told to deliver a load of gears to a certain department. He did so and asked the foreman where to put them. The gears were of an odd number and were loaded on a tray on the truck. The foreman ordered him to "put half of them on the table at my left and half of them on the table at my right".

The boy asked, "How can I do that? There is an uneven number of gears on the tray".

"Hell, I don't know," the foreman bellowed, "cut the tray in two I guess".

The boy obediently took the truck load of gears out of the de-

partment and was gone about 15-minutes. He came back with the tray actually cut in two. That foreman certainly needed a course in job instruction for training beginners.—F. HAGAN.

Put All Materials Into Production or Scrap

Treat the factory to a house cleaning. What was junk six months ago has its place in the war effort now. Sort rubbish carefully. Salvage what can be used, and burn or otherwise dispose of the real rubbish that cannot be used anywhere. Keep the premises clear of debris. This is the only method by which it can be made certain that there is nothing further to be salvaged.

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Every bit as important as salvaging vital materials, is the need to conserve what we have. Let us use less material by making better use of what we have. We must get this message across to the workers. It will benefit our sons and relatives in the armed forces. By preventing spoilage and breakage, the material we work with can be turned against the enemy.

Above all, let us make clear to all personnel that until the day when we have actually turned out all the war equipment we need to smash the Axis, salvage and conservation are going to remain vital phases of our production. Unless our scrap is turned into weapons now, America will be fighting the war with one hand tied behind its back—fighting powerful, well organized enemies across both of our oceans.

Wartime Foreman's Production Problems

★ In regard to production painting in war industry plant, most of our finishing is specified by either the Army or Navy specifications. We have no other course but to follow them. It is a case of, "once you are set up to do so, you just sail or rumble right along".

Our main problems now are not so much with finishes as they are with production. And the production is some job. There are a thousand things that harass a finishing foreman while working on war production. To mention only a few, for example: Handling the constant change in personnel; overcoming the reluctance of men to put their best into the job; hand-

ling the government set up; selling workmen on Bond Buying; trying to accomplish something with men who are dead from the neck up; working with average men and under-age boys.

Most of the boys give you that stare which plainly says, "What the hell? I'll be in the army pretty soon myself". They just don't seem to give a damn; the young cusses don't.

And the old men? Their look at you plainly indicates, "What the hell" of another sort. "You gotta use us old men now." This is what the expression on their faces tells you; and they do just so much work and no more.

Your old steady men who have been with you for a long time are *class* men. They want to be catered to. They think they are just a little bit better than the new help you have hired. They want the cream of everything and don't want to work hard at it.

In the face of these conditions your hard-working foreman is trying like the very devil to produce. He has to stay in good humor. He dare not be grouchy, etc. It's some job, but I like it.—WARTIME FOREMAN.

Removable Stickers

GUMMED stickers and labels that must be moistened for application may be applied to some types of finished surfaces, as for instance porcelain, without causing any damage, though they are troublesome to get off again. They do not serve so well for the inspector's use in marking rejected and accepted items. But there is a type of sticker with a special adhesive backing that *can be ap-*

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plied without moistening. It will adhere satisfactorily, but can be peeled off without leaving the slightest trace on the surface. These stickers have been found so convenient for use in connection with finished products that they are becoming quite well known.—L. FANTOW.

Hand Cream

THE HANDS of workmen need protection of different kinds in different branches of industry. In the finishing and painting departments what is chiefly needed is a good protective cream that can be applied to the hands before getting into close contact with finishing materials. Most workers will appreciate something of this kind. Protective creams are available which will protect the hands, face and arms against even mild acids, caustics and various liquid solutions, so it will be seen that finishing matrials can be effectively kept from the skin.—A EXTEL.

Removes Burrs Quickly

THERE are many kinds of burrs. The smallest rotary files are called burrs by many. There is the burr in the Scotchman's voice. Remember the sandburs that caused us so much grief as a barefoot boy, and the cockleburs we used to drop unobtrusively into sister's hair? But the burrs I have in mind now are those sharp, knife-like extensions left on many metal parts after they have been machined. These burrs must be removed if we expect to get anything like a good finish on the surface.

There are many ways that have been tried for burr removal, but now a method appears by means of which burrs may be removed as fast as parts can be handled. A special burr-removing tool, if you please. How do you use it? In connection with a lathe, a drill-press, a portable electric drill, or at the end of a flexible shaft, as may chance to be most convenient in your particular case. — A. BURR.

Portable Dust Collector

SUPPOSE your finishing department is located too close to some dusty operation, and it seems that all attempts to exclude the dust have been only partly successful. Possibly yours is a small venture and there doesn't seem to be any way of justifying the expense involved in installing a central dust-collecting system. Possibly too, the dust is from different locations at different times.

The real answer to all of this is a portable dust collector. Such equipment is especially valuable in connection with dry grinding and polishing operations. Using one will bring a double benefit. The dust will be kept down on the operation itself, making it better and healthier for the workmen, and your finishers will not be forever bothered with dust settling on freshly finished surfaces.— FRED CHROME.

Letters from I. F. Readers

(Continued from page 8)

with this plastic, which I think consists of something that must act like a dough before it gets hard. We have found it to be so hard sometimes that a nail would not go through it, and special holes were made during molding operations so as to prevent nails from bending.

I am very much interested in this particular plastic or a similar material which looks like wood, does not require too much laboratory equipment and can be made without having too many restricted materials because of prevailing war conditions.

I wonder if you could furnish me any information on something of this kind? Also, would you be able to furnish me with a book of formulas with regard to materials used for wood plastics and how to make them?

(Second Letter)

The offer you have made to publish my letter might result in a solution of my problem. It might be of interest to many of those who read INDUSTRIAL FINISHING. Someone might take notice of it and this might result in a possible solution. Someone might be good enough to come forward with a better idea. There is always someone who might have had experience in such work.

I will appreciate it if you will publish my letter in your next issue. In printing same, I would like to mention also that there is still another

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problem to be taken into consideration. What does this composition or dough consist of? Does it require a lubricant in the mold so that the composition can be lifted out easily without sticking? What kind of molds are required? What kind of presses? Where could I obtain such presses? Some formulas call for wood flour. Where could I obtain this?—H. R.

Can or will some reader help the man who made this inquiry?—ED.

Paint-Can Shaker

We would like to inquire whether or not you could give us the name of any company who manufactures a shaker for the agitating of 5-gallon cans of paint. If you can recommend any concern who is manufacturing shakers of the above type, please let us know immediately.—Z. Varnish Co.

Information supplied.—ED.

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Stain Bleaches

Please advise us where stain bleaches can be secured, as described on page 42, item 131, of your January 1942 issue.—W. H. S. (Furniture Mfr.)

Information given.—ED.

To Clean Discolored Brass

We have keys which are a natural brass finish. From exposure they discolor and tarnish. Our problem is to restore the natural luster with as little trouble as possible. What we mean is to clean one or a dozen keys at a time without concocting a special formula for each process when needed.—L. I. Co.

We are referring you to some manufacturers of cleaners which we believe will solve your problem.—ED.

Sprayed Plated Finish

Kindly advise us regarding the source of supply for "Sprayed Plated Finish", as referred to in one of your recent numbers.—T. Casket Co.

Information furnished.—ED.

Will Set Up Finishing System

On page 4 of October issue, K. N. Co. asks for someone or a company to set up a fully mechanized finishing

WAR MEMO:

★ ★ ★ ★ ★

The aims behind the War Bond Payroll Savings Plan are worth repeating over and over:

1. To help pay the stupendous production costs of winning this war.

2. To siphon into production channels that portion of America's *current income* which would otherwise flood the Nation with inflationary cash.

3. To create individual backlogs of financial security for use during the industrial readjustment after the war.

4. To create a Nation-wide saving habit which will serve the interests of both Capital and Labor after the war.

Keep after that "10% of gross payroll goal"! Buy War Bonds to the limit yourself—encourage your employees to do likewise!

system. If not too late, I would like to be considered, either as a temporary or permanent proposition, as this is exactly "down my alley". I know woods, metals, finishing systems and materials as well as conveyors, drying tunnels, etc.—W. H. Stevenson.

Permanent Black on Metal

We refer to the October issue of INDUSTRIAL FINISHING, relative to the article by F. A. Westbrook, "Permanent Black Finish", on page 15. Will you please supply us with the name of the process referred to and the manufacturer?—A. P. Co.

Information given.—ED.

Striping Tools

Can you tell us the names of firms who manufacture tools for striping?—G. Mfg. Co.

In a letter we are submitting the names and addresses of several such manufacturers.—ED.

Camouflage Painting

I would like to borrow a few cuts from the September issue of INDUSTRIAL FINISHING Magazine to illustrate my article on camouflage in November issue of the "Technic" (published by students and alumni of Rose Polytechnic Institute). The cuts appeared as illustrations for the article "Infra-Red Reflectance of Paints" by Paul O. Blackmore, beginning on page 28 . . . The proper courtesy line will be used, a copy of the issue will be sent to you, and the cuts will be returned immediately after used.—W. H. P. (Assistant Contributing Editor).

Glad to accommodate you.—ED.

Plywood for Airplane Construction

Reading from your Journal for July 1942, page 70, article entitled "Plywood for Ship Construction", we are interested in this article and would appreciate it if you could inform us where we could secure full technical data on the process.

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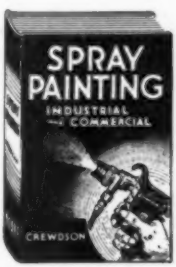

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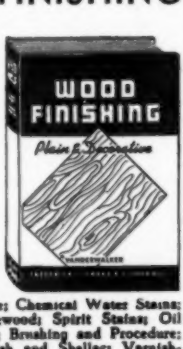

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and have a floor space of 4½ acres. We expect to be called upon to interest ourselves in the manufacture of wood parts for airplanes and would like to have this information if it is possible to get it.

We are also interested in the invention of the nail to take the place of a screw. Would it be possible to obtain a sample of this? If not, kindly give us the name of the manufacturers and we will communicate with them direct.—B. & Co. Ltd. (Sydney, N. S. W., Australia).

We suggest that you get in touch with Vidal Research Corp., 1528 Walnut St., Philadelphia, Penna. This company is doing a lot of work in connection with molded plywood for both ships and aircraft. Also, United States Plywood Corp., 616 W. 46th St., New York, N. Y.

We are still publishing articles about plywood and the proper protective coatings for same and we assume that these copies of the magazine will reach you in due time.

In regard to the special nails mentioned on page 70, these are manufactured by Independent Nail & Packing Co., Bridgewater, Mass.—Ed.

Luminous Paints

We note in your October issue of INDUSTRIAL FINISHING an article on Luminous Paints. We are interested in the various types mentioned and would appreciate having the names and addresses of several manufacturers. We would also like to know if the pigment can be bought separately and mixed by the user as he desires to use it.—R. S. Co. (Enameling & Refinishing).

We have been advised to contact you people as a reference to suppliers of finishing materials. We would like to be referred to a company who produces luminous paint, which we intend to use on switch boxes, fire extinguishers, exits, and other points which should be accessible during blackouts. We will appreciate being put in contact with such a manufacturer.—M. F. Co.

In the October 1942 issue of INDUSTRIAL FINISHING we have just come across an article that interests us very much. The article is "Luminous Paints" by A. H. Jackson. If you could furnish us with the address of the American Luminous Products Co., we would be very grateful to you.—M. H. Co. (Nails).

It is 6420 Marbrisa Ave., Huntington Park, Calif.—Ed.

Chicago Firms Organize Pool for War Business

"Protective Coatings, Inc.," is an Illinois corporation which has been chartered and has finally been approved in Washington by the smaller-war-plants group as well as the War Production Board.

Members are: Bradley-Vrooman Co., The Clinton Co., V. J. Dolan & Co., Elliott Paint & Varnish Co., Jewel Paint & Varnish Co., G. J. Nikolas & Co. and Fred'k A. Stresen-Reuter, Inc. Mr. Bob Clark of the Jewel Paint & Varnish Co. is president; Mr. D. L. Clinton of the Clinton Co. is secretary, and Mr. Leo Guthman is vice-president.

The idea of an organization of this kind came to Mr. V. J. Dolan after he had made numerous trips to Washington and had made several contacts with the various government procurement agencies. Mr. Dolan became convinced that the government set-up was such that it would be most difficult for them to place orders with small manufacturers because their requirements ran into sizable quantities, and the average small manufacturer was not in position to supply what they required within the limited time allowed to produce it. It is understandable that it would be impossible to break down into small units the quantities required because that would necessitate testing countless numbers of samples, in addition to requiring endless clerical work and multiplying almost indefinitely the personnel required.

Having received the same general response from all Procurement agencies that he contacted, Mr. Dolan finally decided to call together a few manufacturers in Chicago to see whether or not it might be possible for them to combine their production facilities and personnel, as well as their laboratory technicians and laboratory facilities. Three or four meetings were held and committees were appointed for the purpose of organizing or getting together such groups as would represent good "business bedfellows," and "Protective Coatings, Inc.," was one of the first results to present an appearance.

The object of the pool is to provide the Government with additional manufacturing facilities capable of handling orders for a sizable quantity of protective coating materials. The Corporation is unique in many respects, in view of the fact it is pioneering in a form of corporation entirely new in the industry.

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Index to Advertisers

Advance Paint Co. ..... Third Cover
Alrose Chemical Co. 36
Aluminum Industries, Inc. 43

Berry Brothers 63
Binks Mfg. Co. 86-87

Campbell Co., M. L. 95-99-100
Chicago Eye Shield Co. 98
Claremont Waste Mfg. Co. 79
Classified Advertising 103
Crown Spray Gun Co. 83

Day & Co., James B. 75
Despatch Oven Co. 77
Detroit Surfacing Machine Co. 1
DeVilbiss Co., The 34-35
Dolan & Co., V. J. 5
duPont deNemours & Co., E. I. 52-53

Egyptian Lacquer Mfg. Co. 46-47

General Industrial Finishes 57

Hammond Chemical Service 99
Hilo Varnish Corp. 61

Industrial Chemical Development Corp. 82

Johnson & Son, Inc., S. C. 45

Keystone Varnish Co. 67
Koch Sons, Inc., George 6

Lawrence-McFadden Co. 90
Lilly Varnish Co. ..... Front Cover
Lowe Brothers Co. 69

Maas & Waldstein Co. 73
Mahon Co., The R. C. 49
Martin Varnish Co. 95
Mearl Corp., The 85
Mitchell-Mayer Co. 91
Murphy Varnish Co. 51

Naz-Dar Company 83
New Wrinkle, Inc. 40-41
New York Woodfinishers Supply Co. 81
North American Elec. Lamp Co. 96

Paasche Airbrush Co. 9
Pulmosan Safety Equipment Corp. 101

Randolph Finishing Products Co. 102
Rayon Processing Co. 97
Reliance Varnish Co. 89
Rockford Varnish Co. 88
Roxalin Flexible Finishes, Inc. ..... Second Cover
Rudd Lacquer Corp. 79

Solventa Recovery Service 99
Southern Varnish Corp. ..... Back Cover
Stanley Chemical Co. 71
Sterling Lacquer Mfg. Co. 7
Sterling Tool Products Co. 5
Stille-Young Corp. 33

United Lacquer Mfg. Co. 6

vanAllen Company, L. R. 96
Varnish Products Co. 8
Vol-U-Meter Co. 81

Watson-Standard Co. 65
Wipe-On Corp. 59

Zapon Division—Atlas Powder Co. 2

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